The Iron Age

A Review of the Hardware and Metal Trades.

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The Otis Hoist for Furnaces and Mines.

We present herewith an illustration of the improved hoisting apparatus for mines and blast furnaces, manufactured by Otis Bros. & Co., at Yonkers, N. Y., and which is regarded as one of the simplest, safest and most practical machines of its kind ever built. It is expressly adapted for continuous use, and has all the parts liable to injury from constant wear so arranged as to be easily and quickly replaced, and so can be continuously run any required period without stopping more than an hour at any one time, and that very rarely, for such renewal. The engine employed is doubled cylindered — reversible — positive motioned, with patent reversing valve gear, and runs in either direction at equal speed. It has balanced valves, steel piston rods with solid heads, metallic ring pistons, boxes of brass and best babbit metal, and all steam joints have ground or scraped surfaces, requiring no rubber or other packing. The reversing valve face is made movable, and both valve and seat can be changed, when necessary, in less than an hour. It has all the merits of our best engines, being compact, easily taken care of, economical of steam, and thoroughly reliable.

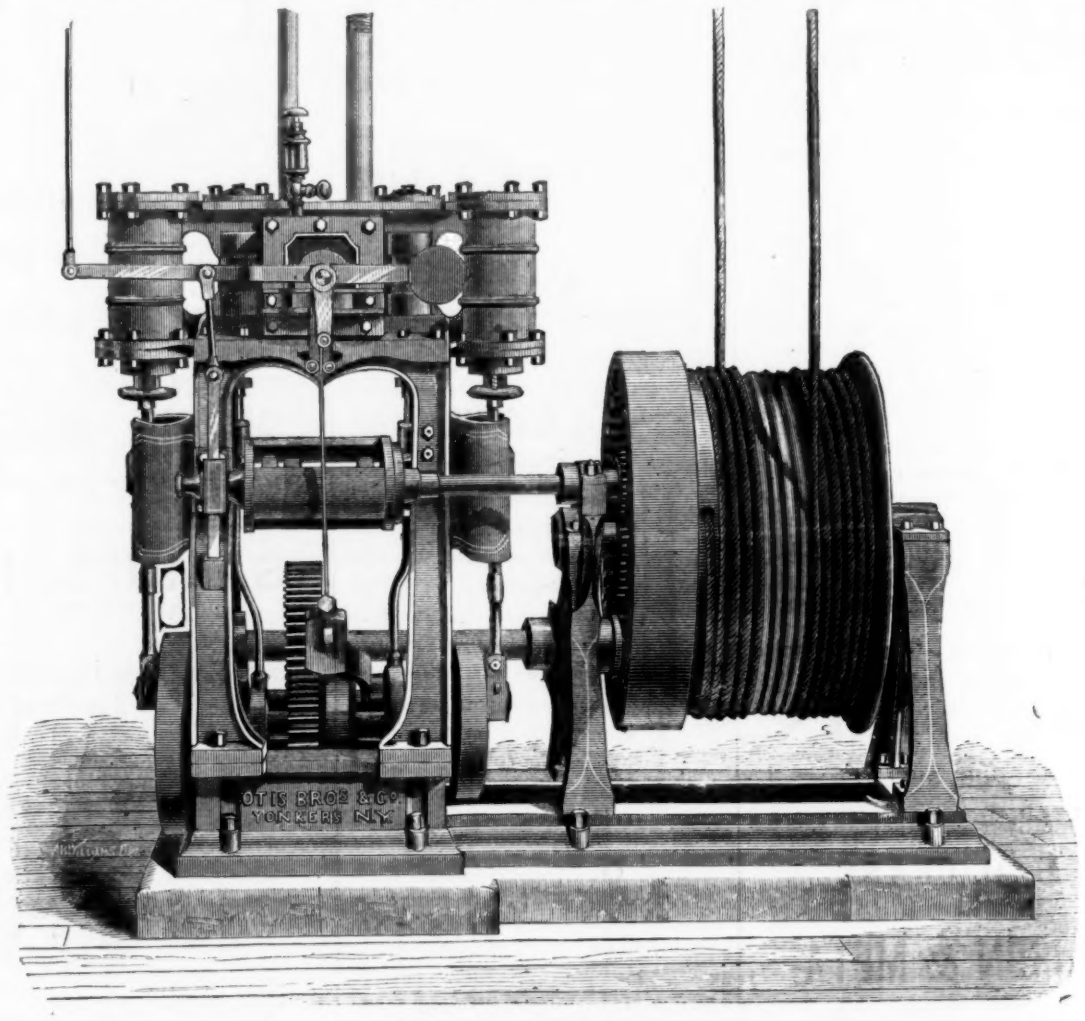
The winding drum, made of large size, and turned and grooved to receive and deliver two wire ropes of suitable strength, is made a part of the engine, and driven by it without belt, by gearing alone—this being machine cut on the quick motion. By these wire ropes, one being wound on while the other is paid off the winding drum, two platforms are alternately raised and lowered, one ascending while the other descends. Platforms are 4 inches smaller than the hatchways—2 inches on all sides. The size of platforms generally preferred for use at blast furnaces is from 6 ft to 8 ft square, to accommodate the barrows.

The engine runs only when the platforms are in use, and is started at furnaces by the "top man" or "filler," by means of a wire hand rope within his easy reach, and requires only occasional attention from the engineer to keep it cleaned and oiled up. It is stopped automatically at upper and lower landings by suitable attachments upon the hand ropes and platforms. Where an extra safe arrangement is desired, an automatic stop motion is attached to the engine. This is unnecessary to the ordinary and proper working of the elevator, but is superadded to the ordinary stop fixtures, and shuts off steam from the engine at the moment the platforms stop, even if by wear or accident the ordinary stopping connections are destroyed.

The automatic brake is also added to all hoisting engines built by Otis Bros. & Co., and is so arranged as to be applied automatically by the act of shutting off steam to stop the machine, and released in like manner when the engine is started. This brake is a very powerful and perfectly reliable device to prevent the settling of the loaded platform after it has been brought to the landing. For mines the engines are located near the shaft, and the drums are made double. The speed at which the various weights are moved may be varied from a maximum of 200 to 500 feet per minute, and may be reduced at will of engineer to any slower speed. The mining hoist has a capacity of 4000 pounds 200 feet per minute; the blast furnace hoist, with platform from 6 to 8 feet square, has a capacity of 3000 pounds 150 feet per minute.

The first special blast furnace hoist built by Otis Bros. & Co. was put in operation at the Riverside Furnace of Messrs. Dewey, Vance & Co., at Wheeling, West Virginia. Its operation there was so satisfactory as to attract the favorable notice of iron masters in that locality, and orders were received for hoists for the new furnaces of the Bellaire Nail Works, the Belmont Nail Works, and the Wheeling Iron & Nail Co. It has also been introduced in the new stack of the Norton Iron Works, Ashland, Ky., where its service is equal to raising 3000 lbs. 200 feet per minute. The engine has cylinders 9 inches in diameter, with ten inches stroke of piston, and is said to be the most powerful yet erected for any blast furnace in the country. The two platforms are so arranged as to counterbalance each other, one ascending as the other descends, so that the engine has little more to do than lift the coal, ore or limestone. Using steam only when the engine is running, the power required is not perceptible at the boilers. The engine is fitted with an automatic brake, holding the platforms immovable whenever they are stopped, and rising automatically the instant steam is admitted again to the engine. The engine's movement in either direction is perfectly controlled by a reversing valve, without the employment of link motion or any other substitute therefor.

Among other furnaces for which hoists have been built or are building at the works of Messrs. Otis Bros. & Co. may be mentioned the following: Harbaugh, Mathias & Owens, Pittsburgh, Pa.; Laughlin & Co., Pittsburgh, Pa.; Stewart Iron Company, Sharon, Pa.; Dunbar Iron Company, Dunbar, Pa.; Crowther Iron Company, New Castle, Pa.; Lochiel Rolling Mill, Harrisburgh, Pa.; Everson, Knap & Company, Fountain Mills, Pa.; Union Iron Works, Newburgh, O.; Hubbard Iron Company, Hubbard, O.; Bellaire Nail Works, Bellaire, O.; Norton Iron Works, Ashland, Ky.; Minerva Furnace, Milwaukee, Wis.; Wheeling Iron & Nail Company, Wheeling, W. Va.; Belmont Nail Works Company, Wheeling, W. Va.; Henry Burden & Sons, Troy, N. Y.; Shelley Iron Company, Shelley county, Ga.; Crown Point Iron Works, N.Y.; Olcott Iron Company, N.Y., and others. That they are well spoken of wherever introduced would seem to be a justification of the manufacturers' claim, that they are the best hoists built for mines and furnaces.



HOISTING ENGINE, BY OTIS BROS. & CO.

Leather Belting.—Its Varities and Manufacture.

The materials used in the manufacture of belting are leather, india-rubber, iron wire and gutta percha. The first is the only material that is employed to any large extent, and having stood the test of use for many years, it is likely that its place will not be supplied to any extent by another material for a long time to come. Its prominent disadvantage is that it is easily impaired by moisture, and must, therefore, be protected from the weather. A great deal of effort has been made to remove this objection, and with considerable success. The firm whose works we have taken for our example in describing the process of manufacture, Messrs. Reidy & Kiely, cor. of Jacob and Ferry streets, make an article, for instance, which they claim will not only run well in moist places, but even in the water. A good belt, however, well protected from the weather, may run for 20 years. Rubber resists the efforts of moisture admirably, and seems to answer very well as a material for belting. Iron wire has been experimented upon, but it requires a peculiar construction of pulleys which makes the cost of its introduction in shops which have formerly used the leather belt very expensive. Gutta percha has been used in a zinc factory in Belgium, and efforts have been made to introduce it in this country.

The best leather that can be obtained must be used in the manufacture of belting on account of the constant friction and straining to which it must be subjected, and the preference is, on this account, universally given to oak tanned leather. It is necessary, also, that from four to six months be bestowed upon the tanning of the leather in order to produce the best results. The result of this careful treatment is that the material has a greater elasticity and regularity of fibre. Hemlock leather is very unsuitable for belting, unless it be in very light work. There is also a belting composed of a union of these two. A chemically tanned leather is prepared in Rhode Island, but very much inferior to oak tanned belting as regards strength and elasticity. The best leather for belting costs from 38 to 42 cents per pound, just as it comes from the tannery, and of this about 33 per cent. is unfit for belting, and must be sold again for 20 cents per pound. In addition to this the manufacturer generally loses from one to two pounds for every hide in cutting and stretching.

The quality of the belting depends also upon the portion of the hide used. The butt, or back, is the only part that is fit for the best work. The shoulder is more spongy than the butt, and the belly is of no use whatever for belting. Good belting, also, must run straight and maintain an even bearing on the pulleys. It is claimed that belts should not be run faster than thirty feet per second.

The greatest width ever given to belting is 48 inches, and below this width all sizes are made down to ⅛ of an inch. It is very rarely, however, that such hides are to be obtained as to give the maximum of width just mentioned. A belt sent by Messrs. Reidy & Kiely, of this city, to a firm in Burlington, Vt., measured 100 feet in length, 38 inches in width, and was composed of three thicknesses; its weight was 1300 lbs. The weight of belting, when less than six inches wide, is about one pound per square foot. Above this width the weight is about 1⅛ lbs. per square foot. An average coil of belting is from 350 to 400 feet long. The thickness of belts varies from 3-16 to ¼ inch. When the width of the belt, however, is greater than 12 inches, two thicknesses are generally employed, and even below this width a double thickness is sometimes used where great strength is required. Twist and solid belting are also occasionally used, the former where there is but little space to spare on the pulley and considerable strength is required; the latter for light machinery, such as sewing machines.

The method of splicing employed affects materially the strength of the belt. If the shoulder be used it is customary to splice the two adjacent sections of the belt together by bringing shoulder against shoulder and butt against butt. As the shoulder is softer than the butt, a long lap must be made where the shoulders are brought together, and a short stiff lap where the two butts are joined. This is called long lap belting. When, however, the shoulder is not used, it is customary to splice the butt of one section to that end of adjacent section nearest the shoulder, which gives a short lap. As the shoulder is not so reliable as the butt the short lap belting is generally preferred to long lap belting.

THE HIDES

are received from the tannery in huge rolls. As regards the particular kind of hide best suited for belt leather, we remark that the hides of oxen are tougher than those obtained from bulls, and that cowhide in toughness is intermediate between the two. The wild Texan cattle afford a very tough leather, but the process of branding them renders their hides very unfit for belting purposes. Wherever the brand occurs, the leather, of course, is useless. Our home slaughtered cattle yield a material which is quite satisfactory. Leather obtained from the hides of other animals than bullocks is very seldom, if ever, used for the purpose of belting. Calf skin is too weak; sheep skin yields a thin, cheap leather; lamb skins are only used for gloves; goat and kid skin yield a light leather of fine quality; horse hide is mostly used for horse collars, bellows, etc.; dog skin makes a very tough leather; hog skin furnishes a thin, porous leather; hippopotamus hides from South Africa, tanned with oak bark, yield a thick and spongy leather, but cannot be used for belting; rat skins are used for glove leather; sealskin leather furnishes a fine, strong leather; porpoise skins have been made into strong and beautiful leather.

In beginning the

PROCESS OF MANUFACTURE,

the hide is cut up into its various parts by removing the belly and shoulders. This process seldom leaves more than three-fifths of the hide for belting. The remainder is generally sold, and used for other purposes. In determining the dividing line between the belly and the butt, the currier simply folds the leather between his fingers, having by practice learned how to discover in this manner the precise line of junction between the good and the bad leather. The butts are then soaked in water, the length of time required for this purpose varying with the hardness of the leather, some hides requiring only an hour and some a day. The vats used in this part of the process are capable of holding a hundred sides of leather. The butt is then shaved, or "skived," which operation consists in removing the loose portion of the skin next to the flesh. To accomplish this, the currier throws the hide over the "beam"—a stout board firmly fixed in, and projecting from, the floor, about three feet high and a foot wide, inclining toward the workman at an angle of ten or fifteen degrees from the vertical, and faced with a block of lignum-vitæ about two inches thick. The currier allows the hide to hang over so that it rests against the hard wood facing, and leaning upon the portion of hide which hangs upon the side of the beam nearest himself, and so holding it in position, bends over and curries off the loose skin with a knife of peculiar construction. This knife is worthy of special description. It is a two edged rectangular blade about twelve inches long by five inches wide, with a straight handle at one end and a cross handle at the other in the plane of the blade. The edges of the knife are first made very keen, and then turned over to form a wire edge by means of a small steel. Another tool is drawn along the inner angle of the wire edge from time to time. This tool the currier holds between two fingers while he is using his knife. While shaving the leather he shifts the hide from place to place on the beam till the whole surface has been gone over.

The hide is now scoured by the use of water and a hard brush. The dirt which has collected upon it during the life of the animal and the process of tanning is thus finally removed. Then comes the process of "stoning" and "slicking," which consists in rubbing down the inequalities on the surface of the hide by means of a hard stone fixed in a wooden handle. A mixture of tallow and tanner's oil is then applied to the hide, after which it is reset, that is, subjected to the stoning and slicking process just described. The proportions of the oil and tallow to each other in the mixture used in the foregoing process vary with the season. In the summer time more tallow than oil is required, and in the winter time the latter must be used in greater quantity than the former. The tallow is first rendered and the oil is stirred in while the tallow is cooling.

The hide is then placed upon the stretcher. This consists of a long heavy beam provided with two heavy cross pieces, one of which is stationary at one end of the beam and the other is free to slide up and down the beam. The movable cross piece is provided with a pawl, however, which hinges upon it, and may be let down upon toothed rack on the upper surface of the heavy beam so that while the cross piece may be moved up the beam—*i. e.* away from the permanent cross piece—it cannot return unless the pawl be lifted. One end of the hide is fixed firmly by clamps to the stationary cross piece, and the other to the one that is movable. The latter is connected by chains to an axle operated by screw power, and is thus drawn up to any desired point on the beam, the pawl before referred to holding it in position when the power is relaxed. The beam is then removed from the machine and allowed to stand until the leather, which is stretched upon it, has become about three-quarters dry. Immediately upon removing the beam another is placed upon the machine. If the leather is allowed to dry thoroughly while upon the stretcher it does not make such a good belt.

When the leather is removed from the stretcher it is "reset," or rubbed, as in the former process of removing inequalities from the surface, a glass "slicker" being used in this case instead of a stone. The hide is then hung up to dry, which, if the weather is fine, will be accomplished is two or three days, but if the weather is damp a week or more is necessary. The hide is then "straightened;" that is, the edges which run with the grain are made parallel to each other. The hide is placed in a straightening machine, so arranged that the workman brings the knife down upon the leather, removing the crooked edge by the simple action of a treadle.

The leather is then cut by a machine into strips of the proper width for belting, and the pieces are matched so as to bring those pieces of nearly equal thickness adjacent to each other. The ends are then beveled preparatory to splicing the sections together. The beveling is accomplished by a machine so arranged that the knife can be controlled by hand, and the bevel be made long or short, at pleasure. The ends are then "squared;" that is, a shaving from the end is cut off so as to make the end perpendicular to the long edge of the belt. The ends are then "pointed." The beveling does not reduce the thickness at the ends quite to a sharp edge, and this must be effected by hand. A man lays the end of a piece on glass, and with a knife finishes the bevel by cutting off a small sliver at the extreme edge. Then comes the cementing of the ends together. The cement is a composition of isinglass and other materials, and is laid on hot with a brush. The workman first spreads the cement upon the beveled end of one piece and, laying the beveled end of the next section upon it, puts the joint in a press. The press is so arranged that the upper plate can be adjusted by screws so as to be brought very near the lower plate, and for belts of the same thickness this adjustment is permanent. The lower plate is brought up against the upper one by means of a lever about five feet long, which the workman seizes and, bringing it down, fastens with a strap to the floor. He then prepares another joint, and while he is doing this the cement in the preceding joint has set. The plates of the press are made of cast iron and are very heavy.

The joints are then riveted, holes having been previously punched through the leather. Copper rivets and copper burrs are employed, the burr being placed on the rivet after it has been put through the hole, and the end then hammered down. In the factory which we are describing one hundred and fifty dollar's worth of rivets are used in a month. The belt is then finished by shaving off its edges in an appropriate machine. In this machine the belt is fed to the knives through feed rollers, and the knives having been set to the width of the belt the latter is thus finished off and reduced to the proper dimensions, and while passing from the machine is rolled up.

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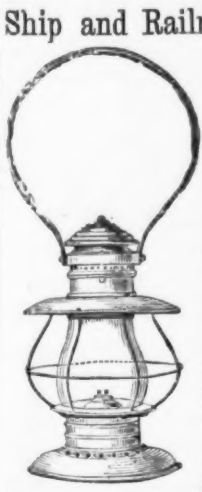

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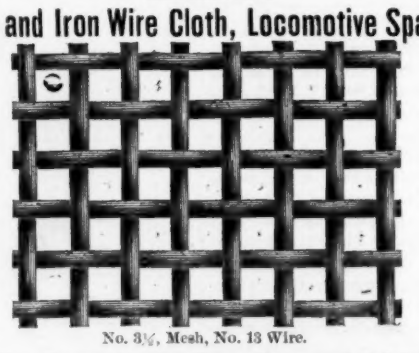

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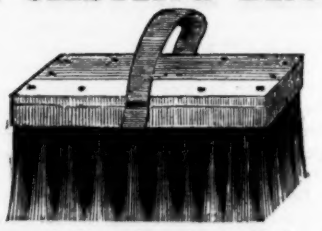

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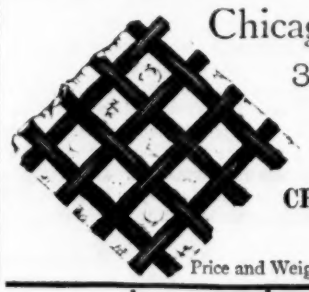

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12	2.10	26	13	1.85	25	14	1.62	25	16	1.51	25	18	1.11	20	20	0.76	20
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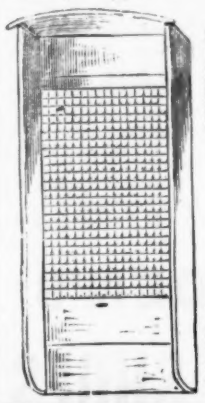

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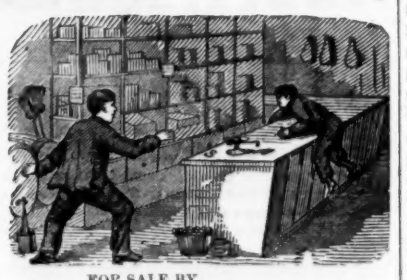

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The Lake Superior Iron Region.

PART I.

The rock formation of the Lake Superior iron region is of the oldest geological age, being made up of the Laurentian and Huronian systems, which contain no remains of animal life, and are hence termed "Azoic." The Laurentian system is here represented by the granite beds, whilst the Huronian, in which the ore beds occur, is made up of a series of strata differing in composition, the character of which is well illustrated by the following section, taken across the country at Michigamme by Brooks:

Mica Schist, Pesheka Schist, Limonitic " Clay Slate "	2500 ft.
Gray quartz	330 ft.
Magnetic ore	40 "
Mixed ore	100 "
Mixed specular	100 "
Diorite ("greenstone")	200 "
Mixed magnetic ore	1000 to 1300 "
"Soft hematite" ore	
Granite	

As is thus apparent, the ore beds occur between the quartz and diorite, the former constituting the "hanging," and the latter the "foot," wall of the seam. The diorite is composed of feldspar and hornblende. Thin layers of chloritic and talcose schists often intervene between the ore and its walls, or lie in the center of the seam itself.

According to the opinion of those geologists who have recently examined the formation with great care, the ore was originally dissolved out from the pre-existent strata by chemical agency, and deposited by precipitation in horizontal beds, which were afterward exposed to great heat and pressure, resulting from the great upheaval and disturbance which characterized the Azoic age—by which the strata were upturned, pressed into folds, and displaced, in a similar manner to the formation along the line of the Allegheny Mountains. By subsequent erosion the tops of these folds were removed, giving to the ore beds the general appearance of fissure veins, although, upon careful investigation, none of the phenomena accompanying veins of this class can be discovered.

Only two general classes of ores have as yet been found in the region—the hematites, or sesquioxides, containing two equivalents of iron to three of oxygen, and yielding, when absolutely pure, 70 per cent. of metallic iron; and the magnetic ores, or proto-sesquioxides, consisting of three of iron to four of oxygen, which yield 72·41 per cent. of metallic iron when equally pure. There are, however, a number of varieties belonging to each class; thus, under the general name of hematite, are found the "specular," "specular slate," "slate," "massive," and other forms; also, the soft red and brown ores containing water, to which alone the name of "hematite" is technically applied in this region. Among the magnetic ores the difference is chiefly one of structure; thus, there are coarse and fine grained and steely ores, differing merely in hardness and fusibility.

It is difficult to account for the variations in the character of the ore at different points along the line of the deposit. At the eastern end of the line the slate and hard hematite ores are found exclusively, while further to the westward the specular and magnetic come in; and, indeed, in every mine several dissimilar varieties of ore are found, showing how varying and intricate must have been the conditions under which they were formed. Thus, in the Jackson, veins of soft hematite are found running through the main body of hard ore; in the Champion, a seam of specular ore coming in cuts out entirely the magnetic, which had, until then, formed the entire body of the seam, and the ore is specular from thence westward. At the point of junction of these two chemically different materials many curious specimens, showing their mechanical admixture, may be obtained.

The magnetic ore deposits seem to occur in a more regular form than the others. In their case the hanging and foot walls are usually well defined, and the seam is of constant width. The large hematite deposits, such as those of the Jackson, Cleveland, and Lake Superior mines, are more in the form of lense-shaped masses, with "fins" or "leaders" stretching out through the inclosing rock in different directions. Some of these deposits hold immense quantities of ore, as in the case of the mines mentioned above, where they have been worked for years, and are still not exhausted. In the same mines, however, may be seen seams of hematite ore which are well defined, having a regular width, dip, and strike, and which are being worked downward upon the incline.

In the vicinity of Negaunee and Ishpeming, and at Cascade, about 5 miles to the south of them, are situated the largest deposits of hard and soft hematites. At Negaunee, about 13 miles west from Marquette, are the mines of the

JACKSON IRON CO.,

first opened in 1846, though no ore was shipped from them until ten years later. They are located upon a series of lense-shaped deposits of great extent, one or two of which have been entirely worked out. The whole system is intersected by a tunnel, driven at the lowest possible level, through which the cars are drawn from the railroad by a small locomotive. The ore is loaded into skips, and hoisted up inclines from the pits by engine power, and dumped into pockets above the tunnel, from which it is loaded into the cars. The production of these mines from 1856 to the present time has reached the enormous amount of 1,125,882 tons, of which 67,736 tons have been shipped during the present season.

The Jackson ore is considered one of the standard ores of the region. It is a hard slate ore, very pure and rich, yielding about 65 per cent. of metallic iron, and great pains are taken in its selection. Some veins of soft hematite traverse these deposits, but the largest proportion of ore of that nature produced by the company comes from their "south side" mines, located on a parallel seam to the south of the main deposit. There are now four openings upon it, and a large quantity of the ore is mined, 14,000 tons having already been extracted. Analyses of several samples of it gave the following results:

Metallic iron	52 to 55·50 per cent.
Silica	5·50 "
Manganese (determined in only one sample)	10·70 "
Sulphur	0·10 to 0·20 "
Phosphorus	0·10 "

The stockholders of this company have two furnaces at Fayette, Mich., and two more at Sharon, Pa., and propose hereafter to utilize almost their entire production to them. The Jackson ore has been used satisfactorily in the manufacture of Bessemer iron.

At Negaunee, also, are the McComber mines, operated by several of the stockholders of the Cleveland Iron Mining Company. These are situated upon the same range of ore as the south side Jackson, the ore being a soft hematite, evidently containing considerable manganese, as crystals of the oxide of that metal are often visible in streaks through it. Over 20,000 tons of this ore have been sent to market during the present season. It lies in lense shaped masses and is mined by open pits.

Between Negaunee and Cascade are a number of soft hematite mines. The Marquette and Pacific Rolling Mill Company have one quite extensive and well located mine, the ore being apparently of good quality. The Tilden, Ogden and Foster mines, the property of the Iron Cliffs Company, are all located upon beds of soft hematite. Operations at the two former have now been abandoned, as the ore proved too silicious, but the Foster is still worked, the deposit there being of better quality, though still somewhat silicious, and much mixed with quartz.

The same company have a very large extent of property in this region, over a considerable portion of which immense deposits of a hard silicious ore, which rings like a bell when struck, have been found. A report was made upon these deposits many years ago by Foster, upon the strength of whose representations extensive preparations were made by the Pittsburgh & L. Angeline Company to open up a hill—apparently entirely composed of the material—which was named the "Iron Mountain." A branch road was built to it, and a large number of dwellings erected for the miners, but the ore proved too silicious to be profitably worked, and operations have been discontinued. It was tried at the furnaces of the Iron Cliffs Company, at Negaunee, and is said by them to yield about 40 per cent. of iron, and to contain manganese and cobalt. It required a very large amount of flux.

The ore of the Cascade region is a hard slate, occurring in layers interstratified with red quartz. These layers are usually quite thin, there being very few seams of pure ore of any size, so that all the material thrown out by a blast has to be hand picked, and the quartz removed by the use of hammers. By this means it is possible to produce a clean bright ore, mostly in small lumps, which is, however, considered to be somewhat silicious, although no analyses of it have yet been published. Some seams of ore of the very best quality have been found, but they are usually quite limited in extent. It is to be hoped that more extensive deposits may be discovered in the future. The mines at present in operation in this region are those of the Cascade Iron Company, and the Watson, Pittsburgh and Lake Superior and Wilcox & Bagaley, which, together, have shipped over 30,000 tons during the present season. The ore lays in such a way as to be easily mined, but it is necessary to take out about as much rock as ore. The hand picking is also a costly process, yet it pays to extract this ore.

The ores found in the neighborhood of Ishpeming are very similar in character to those at Negaunee, consisting of hard and soft hematites, no magnetic ores having been so far discovered. A little to the east of the town are

THE CLEVELAND MINES,

worked by the Cleveland Iron Mining Company, which are located upon a series of large deposits of massive and slate ores lying in the main ore belt. The ore here seems to have been segregated into a series of lense shaped masses of great extent, from the under side of which the main seam dips off. This latter is in many places as much as 80 feet in thickness, and will average nearly 50 feet, so far as it has yet been developed in the main workings, which consist of five separate excavations, the main one being 400 feet long, 250 feet wide and 60 feet deep. At the eastern extremity of this the seam makes a bend to the north, and another large deposit opens out, which is several hundred feet in length and width. A main shaft has been sunk in the angle between the two to the seam, which dips toward it from the under sides of each. The mining is now being carried on down the incline at these points.

Several hundred feet to the southwest from the main workings is the "Schoolhouse" opening. Here the seam varies from 8 to 32 feet in thickness, averaging over 20 feet. It dips to the westward at a considerable angle, and the stopping is being carried on down the incline, leaving pillars in some places 14 feet square and 25 to 30 feet high. A shaft has also been sunk at a short distance from this opening, and a drift made from it to the seam, so that in three or four years the workings of the Cleveland will be almost entirely underground. As the seam is in many parts of too great width to allow of the use of the ordinary system of mining, it is proposed to leave a certain thickness of strata in the center intact, and thus to work it as two separate seams.

The ore is throughout of equal quality with that of the Jackson and Lake Superior mines, although somewhat different in appearance, being coarsely or finely granular, compact, or of slaty structure similar to the Jackson. Some of it is also closely intermingled with diorite. That of the Schoolhouse opening is of extreme hardness, 60 or 70 drills being often dulled whilst cutting a hole in it 3 ft. in depth, the time occupied being an entire day. It is, however, of magnificent quality, being entirely free from quartz or other impurity throughout the extent of the seam.

In the main workings occasional knobs of a mixture of ore and quartz (known as "mixed ore"), and masses of chlorite and diorite, have been encountered, but the main body is composed entirely of pure ore. In the exploitation of this the use of nitro-glycerine is general, a man being engaged for the express purpose of handling it. At the Jackson Mine the "nitro-glycerine man" was recently killed by an unlooked for explosion of the material, since which its use has been abandoned there. It is said that the miners surrounded and attempted to kill the agent who first endeavored to introduce the article here, and he only escaped by threatening to scatter amongst them the contents of a flask of it which he held in his hand. In spite of the many accidents which have attended its use, it is still in constant demand here, on account of the great economy with which it can be employed in many cases, particularly with hard ores, and in "blockholing," or splitting up the large blocks thrown out by blast, such fragments as are too small for such treatment being broken up with sledges. The materials, thus prepared, after careful separation from rock and inferior ore, is loaded into skips, and hoisted up inclines at angles from 45 to 90 degrees, dumped automatically into pockets on the surface, and from thence loaded into the cars as required. The hoisting machinery for several inclines is here, and at most of the other mines, located in one building, the power being transmitted through several hundred feet of wire cable passing over guide pulleys to the top of the incline. Both clutch and friction gearing are in use here. The latter is now coming into general use throughout the region, the grooves being V shaped. All of the machinery in use at this mine is of a good order. Two new pumps have been put in, having a diameter of 12 inches and stroke of 10 ft., geared on to the same engine. A Hall's pulsometer has also recently been introduced. Most of the workmen employed here are Swedes. They work right along throughout the winter, and pile up an immense stock of ore for shipment during the ensuing season. The shipments of this company for 1872 were over 150,000 tons, and will reach about the same amount for this year, 84,000 tons having so far been shipped, which is considerably more than any other company has done. Having their own ore docks at Marquette, with a capacity of 5000 tons, and their own vessels and transports, they are enabled to handle this vast product with perfect facility. The total production of these mines up to present time has amounted to about 1,100,000 tons.

Upon a 40 acre tract adjoining the Cleveland workings, is situated

THE NEW YORK MINE.

The deposit of ore here is precisely similar in character to that of the Cleveland, being simply a continuation of the same seam. The workings comprise two main excavations, in the more southern of which the seam dips to the southward at a regular angle, and in many places presents a face of clean ore fully 50 feet in width. It is directly overlaid by a stratum of chloritic schist about 3 feet thick, which is in turn overlaid by a heavy bed of quartzite. The ore at this point very much resembles that of the "Schoolhouse" opening of the Cleveland mines, being an exceedingly fine grained or steel ore, very difficult to drill. Many different forms of drills have been tried upon it, among which were the Burleigh and Diamond, but the common hand drill proved the most efficient when well handled and made of good material. The seam is being stoped down the incline, pillars being left for the support of the strata above. In the north opening the ore is softer, and occasional streaks of highly crystallized specular iron are found pervading it, as well as cavities or "vugs," containing quartz crystals. About 488,000 tons of ore have been produced at this mine since the opening in 1864, of which over 37,000 tons were shipped during the present season.

Report of Inspections made by the Hartford Steam Boiler Inspection and Insurance Co., for August, 1873.—The number of inspection visits made during the month were 1087; boilers examined, 2026; internal examinations, 563. The hydraulic pressure was applied in 180 cases. The defects in all discovered were 719, of which 176 were regarded as dangerous. The defects in detail were as follows: Furnaces out of shape, 51—6 dangerous. Fractures, 48—21 dangerous. Burned plates, 35—19 dangerous. Blistered plates, 123—27 dangerous. Deposit of sediment, 105—15 dangerous. Incurustation and scale, 97—7 dangerous. External corrosion, 77—22 dangerous. Internal corroison, 18—5 dangerous. Internal grooving, 8—2 dangerous. Water gauges defective, 37—4 dangerous. Blow-out defective, 27—6 dangerous. Safety valve overloaded, 21—5 dangerous. Pressure gauges defective, 83—16 dangerous. Boilers without gauges, 100—3 dangerous. Deficiency of water, 7—4 dangerous. Braces and stays broken and loose, 47—25 dangerous. Boilers condemned, 22. We feel compelled to call attention to the importance of cleaning boilers out often through hand holes. We have frequently recommended this precaution, and we speak of it again because steam users do not seem to attach the importance to it which they should. Scale is thrown off from the boiler, perhaps by some solvent, it accumulates on the bottom, and if not removed becomes conglomerated with other impurities, covers the fire sheets, and the result is they are sooner or later badly burned. We would advise all steam users to see that this work is not neglected.

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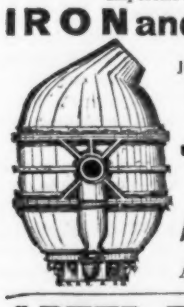
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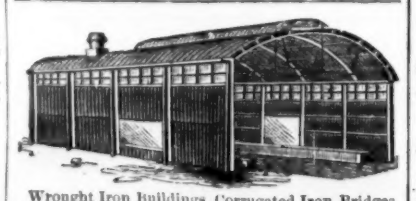
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SECOND FLOOR.

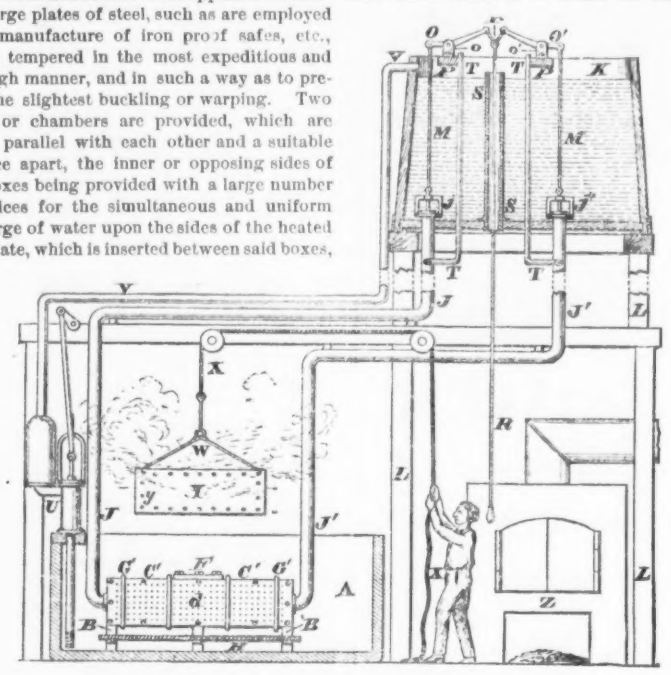
New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN APPARATUS FOR TEMPERING STEEL PLATES AND SIMILAR ARTICLES.

Specification forming part of Letters Patent No. 141,837, dated August 12, 1873; issued to Herman Urban, of Cincinnati, Ohio.

This invention relates to an apparatus wherewith large plates of steel, such as are employed in the manufacture of iron proof safes, etc., can be tempered in the most expeditious and thorough manner, and in such a way as to prevent the slightest buckling or warping. Two boxes or chambers are provided, which are placed parallel with each other and a suitable distance apart, the inner or opposing sides of said boxes being provided with a large number of orifices for the simultaneous and uniform discharge of water upon the sides of the heated steel plate, which is inserted between said boxes,



IMPROVED APPARATUS FOR TEMPERING STEEL PLATES.—*Fig.* 1.

as hereinafter more fully described. The water thus projected upon the heated plates holds in solution common salt or other chemical agent, such as will produce a suitable "pickle," and this pickle is contained in a reservoir, which is elevated from twenty to forty feet so as to give a good head or pressure of water in the above described boxes or chambers. The water is conducted from this elevated reservoir to the perforated boxes by suitable valve guarded pipes, and after being ejected from said boxes upon the heated plates it flows into a tank, within which these boxes are located. After being used, the water is returned from the tank to the elevated reservoir by any suitable pumping apparatus, thus avoiding any waste of the pickle.

Figure 1 is a vertical section of a tempering apparatus embodying these improvements, a heated plate of steel being shown as in the act of being inserted between the perforated boxes. Fig. 2 is a transverse section of the perforated boxes, showing a plate of steel inserted in position between them and the jets of water discharging upon the sides of said heated plate.

A represents an open tank of any suitable dimensions, and having secured within it a number of transverse beams or sills, B, for the support of boxes or chambers C C'. These boxes are rectangular vessels, and are preferably made of cast iron, although they can be constructed of wood, in which case the planks composing them should be stout enough to resist the pressure of water that is exerted within said boxes. The inner or opposing sides of these boxes consist of plates D, which are pierced with a large number of perforations, *d*, that may be of any suitable size, and as near together as will be the most effective. The tops of these boxes have opening which are covered with caps F, the removal of which permits said boxes being cleared of any sediment or other obstructions that may accumulate within them and choke up the discharge orifices *d*. Securely bolted to the upper and under sides of these boxes are guides G G', between which the heated plate of steel Y is inserted. The distance from these guide-

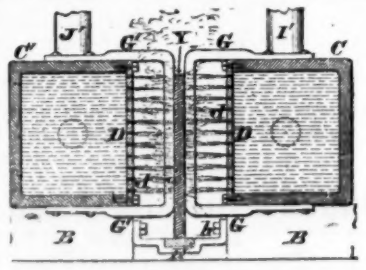
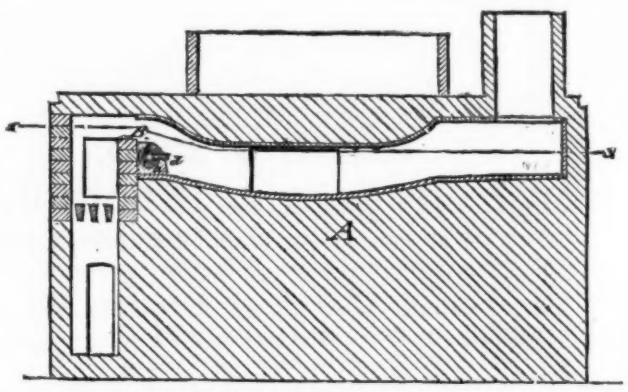


Fig. 2.

bars to the boxes should be such as to maintain the heated plate in a position that will insure it receiving, simultaneously on both its sides, the full force of the numerous jets of water as they issue from the orifices *d*. Brackets *h* attached either to the sills B or the under side of boxes C C' serve to support a longitudinal bar or shelf, H, upon which the heated plate of steel rests, as more clearly shown in Fig. 2. The chambers C C' have attached to their ends inlet pipes I I' J J', which communicate with an elevated reservoir, K, the latter being supported upon a staging, L. This reservoir may be placed at any suitable elevation—say from twenty to forty feet, or more, according to the pressure of water which it is desired to have within the perforated boxes. The ends of the pipes I I' and J J', which project within the reservoir K are provided with puppet or other suitable valves that are capable of being opened by rods M. These rods extend up, and are attached to the short arms of bell cranks O O', the latter being pivoted to brackets *o o'*. These brackets project from beams P, which are disposed athwart the upper end of the reservoir. In order that the discharge valves may be opened and closed simultaneously, the long arms of the said bell cranks are connected by links *r* with a rod or rope, R, which extends down near the tank A, so as to be readily grasped by the operators who handle the plates. This rod or rope traverses a tube, S, which passes up through the reservoir, which tube may serve as an overflow pipe for the same. Attached to the discharge pipes that lead from the reservoir and below the valves are small tubes T, whose upper ends project above the water level in said reservoir. The object of these small tubes is to admit air below the valves as soon as they are closed, so as to insure the drainage of pipes I I' and J J', which precaution is necessary to prevent them freezing up and bursting in the winter season. A pump, U, having a discharge pipe, V, is employed for returning the water from tank A to the elevated reservoir K. In the drawing this pump is shown as being operated by a crank and pitman; but it is evident that an independent steam pump, a siphon pump, or other suitable means may be employed for elevating the water. Grappling irons or hooks W, depending from a rope or chain, X, facilitate the handling of the heated plate Y. Any approved form of furnace, Z, may be employed for heating the plates.



IMPROVED CALCINING FURNACE.—*Fig.* 1.

The plate Y to be tempered is first cut to the proper size, and perforated at *y* for the reception of the bolts, rivets, etc., after which it is placed in the furnace Z and heated to the proper temperature. After being thus heated the plate is removed from the furnace and conveyed to the side of the tank, at which position the hooks W are inserted in the aperture *y*, and the plate elevated above the tank, and then allowed to descend between the guides G G and rest upon the supporting shelf H, which operation is accomplished in a few moments. As soon as the heated plate has been deposited upon the shelf the operator then pulls the cord or rod R so as to open simultaneously the valves *i i'* and *j j'*, and allow the brine or pickle contained within the reservoir K to descend and fill the boxes C C', and issue through the orifices *d* directly upon the sides of said plate.

Owing to the head of water due to the elevated reservoir, the jets are ejected simultaneously, upon both sides of the heated plate, from the perforations in the opposing boxes C C', and the result is that said plate of steel is uniformly cooled throughout its entire length and breadth.

This method of tempering the plate renders it equally hard at every point, and as it is cooled in a perfectly uniform manner it never "buckles" or warps in the least, and when removed from the bath presents as flat and unwarped appearance as it did before being placed in the furnace.

When the plate has been sufficiently cooled it is withdrawn from between the guides G G', and the water discharged into the tank is returned to the reservoir by the pumps U, after which the above described operation may be repeated until the requisite number of plates have been tempered.

As the same water is used over and over again there is no waste of the pickle, thereby effecting a saving of water and salt, and preserving the brine of the same strength.

The form of perforated box, shown in Fig. 5, is intended for angle-steels, corner pieces, etc., and it is evident that this method of tempering, by projecting jets of water from the opposing sides of perforated chambers, boxes, pipes, or other receptacles upon heated plates, can be arranged so as to be employed for any shape or size of sheets that require hardening.

Claim—1. A tempering apparatus consisting essentially of two or more perforated receptacles, between which the heated plate is temporarily placed and subjected upon both of its sides to the action of jets of water or brine, which are simultaneously ejected under pressure from said perforated receptacles, substantially as herein explained.

2. The combination of tank A, boxes or chambers C C' D *d*, guides G G', support H, pipes I I' J J' *j j'*, reservoir K, valve operating device M O O' R, and pump U, or eqivalent devices, for the object herein stated.

IMPROVEMENT IN FLUX FOR SMELTING ORES.

Specification forming part of Letters Patent No. 142,186, dated August 26, 1873, issued to Samuel D. Young, of Elizabethtown, Ill.

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of my

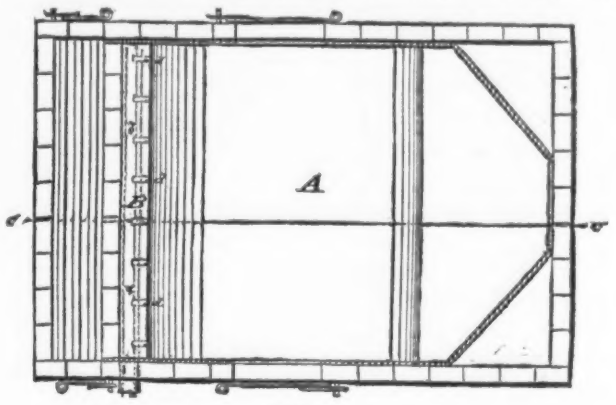


Fig. 2.

furnace for calcining fluor-spar and lead ores, on the line *c c*, Fig. 2, and Fig 2 a horizontal section of the same on the line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of this invention is to produce by a calcining process from fluor-spar an improved flux for iron ore, and, by a similar treatment of lead ores, mixed with fluor-spar, the rapid separation of the calcined spar from the lead ores. The invention consists in the improved fluor-spar flux for iron, hereinafter described and claimed.

A in the drawing represents a reverbatory furnace of the usual construction, which is provided with a fire bridge, B, of fire clay, through the inside of which passes an iron tube, *a*, which again surrounds a steam pipe, *b*, connected to a steam boiler of suitable pressure. To the steam pipe *b* are applied, in the longitudinal direction of furnace A, the smaller steam jets *d*, which pass through pipe *a* and holes of the fire bridge in such a manner that only the opening from which the steam issues is exposed.

The fluor-spar or lead ore to be calcined is placed in the furnace and roasted until a red heat is obtained. The steam is then admitted through pipe *b* and jets *d* on the charge in such quantity as to produce the thorough calcination of the same. The specific gravity of fluor-spar undergoes a considerable change, so that the separation of the same from lead ore is facilitated in a great degree.

The application of fluor-spar as a flux for iron ore is well known, but in its natural state it is detrimental to the hearths of iron furnaces. The fluor-spar, however, which is treated by the calcining process described, forms a superior flux for iron ore without destroying the brick lining of the furnaces.

The calcined spar, when produced from the lead ore with which it is formed, is turned thereby to satisfactory use in the arts, while the calcining process at the same time, by melting the minute particles of lead, which are carried off by the old processes, increases the yield of the ore. The ore is also desulphurized, and the carrying off of particles of lead through the chimney prevented for the same reason, so that a greater percentage of lead is produced from the ore.

Claim—As an improved flux for iron, the calcined fluor-spar as described.

IMPROVEMENT IN HARDENING STEEL WIRE AND THIN SHEETS OF STEEL.

Specification forming part of Letters Patent No. 141,105, dated July 22, 1873, issued to Alfred Benjamin, of Newark.

This invention relates to a new process of hardening steel wire or thin steel, and consists as follows: The wire or thin steel is heated to a red heat by any of the known processes for uniform heating. It is then taken from this heat and subjected immediately to a strong blast of air or gas, so as to cool it rapidly, varying the temperature of the air blast and its degree of velocity, as may be required to give to the steel wire or thin steel the requisite degree of hardness. After this the substance may be tempered, as desired, for the various uses to which the material is to be applied.

These processes may be made continuous, so that while one portion of the material is being heated another portion is under the blast of air, while another portion may be in the tempering; or two of the processes may be made thus continuous, as the heating and hardening processes, for instance.

Claim—1. The process of hardening steel wire or thin steel by treating it, when properly heated, to a strong blast of air or gas, substantially as herein set forth.

2. The continuous process of treating and hardening steel wire or thin steel, wherein the material, as it emerges from the heating process, passes at once into a strong blast of air or gas, substantially as described.

3. The continuous processes of heating, hardening, and tempering steel wire or thin steel, wherein the material, as it emerges from the heating process, passes through a strong blast of air or gas, and thence into the tempering process, substantially as fet forth.

IMPROVEMENT IN ALLOYS TO RESEMBLE SILVER.

Specification forming part of Letters Patent No. 142,760, dated September 16, 1873, issued to Adele Elise Pirch-Baudvin, of Paris, France.

The nature of said invention consists in the production of a metallic alloy resembling silver more closely than any alloys heretofore produced in color, specific gravity, malleability, ductility, ring and general characteristics.

For these purposes the following metals are combined: Copper, nickel, tin, zinc, cobalt and iron.

The following proportions are suitable, and produce a very white and silver-like metal:

	Parts.
Copper	71·00
Nickel	16·50
Cobalt	1·75
Tin	2·50
Iron	1·25
Zinc	7·00
	100·00

In some cases, also, a small proportion—say one-half per cent.—of aluminium is added.

The nickel is first alloyed with an equal weight of copper, and the zinc also with copper in the proportion of six parts of the former to ten of the latter. The nickel alloy, the iron, the remainder of the copper, the cobalt (in the state of black oxide), and charcoal are then placed together in a plumbago crucible. The charge is covered with charcoal and the whole is exposed to a high heat. When the materials are melted the heat is reduced and the alloy of zinc and copper is added when the heat is such that it will just melt freely. This having been done, the crucible is taken from the fire and stirred with a rod of hazelwood. The tin is then added. It is wrapped in paper and dropped into the crucible. The metal is again stirred and at once cast into ingotmolds. It can afterward be rolled and otherwise worked as silver is worked.

Much of the zinc is volatilized in the process of melting, and the proportion ultimately remaining in the alloy is small.

The superiority of this alloy over other silver like alloys depends mainly upon the influence of cobalt. If the cobalt be omitted from the alloy it will cease to have a silver-like appearance.

Claim.—The manufacture of an alloy resembling silver, substantially in the manner described.

Making Iron with Peat.

The Marquette *Mining Journal*, describing a peat furnace in that district, says:

This furnace having been enlarged by making its boshes 9 feet, and having its hight increased to 48 feet, with enlarged and improved hot blast, greater boiler capacity, etc., went into blast on the 1st inst., and is now working exceedingly well. The fuel used is principally soft wood charcoal, some of it weighing but 14 lbs. to the bushel, and the best of it not more than 17 lbs. to the bushel, the latter being pit and the former kiln coal. The furnace was first filled with charcoal, which, after being fired for some time, did not produce sufficient gas to run the boiler or the hot blast, when a small quantity of peat was introduced, and an abundant supply of gas was immediately produced, and peat in small quantities was then kept on and a run of iron was obtained within a few hours. The peat weighs 40 lbs. to the bushel, and is prepared by passing it through a large cylinder where it is operated upon by revolving cutters, and then being spread upon platforms is cured by the weather. With 400 lbs. of charcoal 120 lbs. of this peat is now mixed, and with three-quarters of a pound blast pressure from eight to ten tons of iron per day are produced, and the yield is gradually on the increase. The ore used is the best of the Lake Superior mine, one quarter hematite and three-quarters specular. It is intended to gradually increase the amount of peat, as the furnace works its way forward toward its estimated capacity of twenty tons per day, until the amount used will equal the charcoal in bulk, and it is concluded that it will not only prove the stronger fuel, in its heating qualities, but that it will carry the burthen of the furnace equally as well as the charcoal.

The iron so far made is of superior character, and the furnace is working so smooth and promising that the success of the peat is now considered beyond question. This is but the first step toward a large iron works on this spot for the use of this fuel. Its adaptation to puddling and heating furnaces has been demonstrated in several instances where the gas processes are used, and now, it having been shown that ores can be smelted with it, there is no reason why the immense deposits of this material in this region should not be turned over to the account of iron manufacture. This furnace has 550,000 bushels of the prepared peat ready for use, and an inexhaustible quantity near at hand which can be prepared at a trifling expense.

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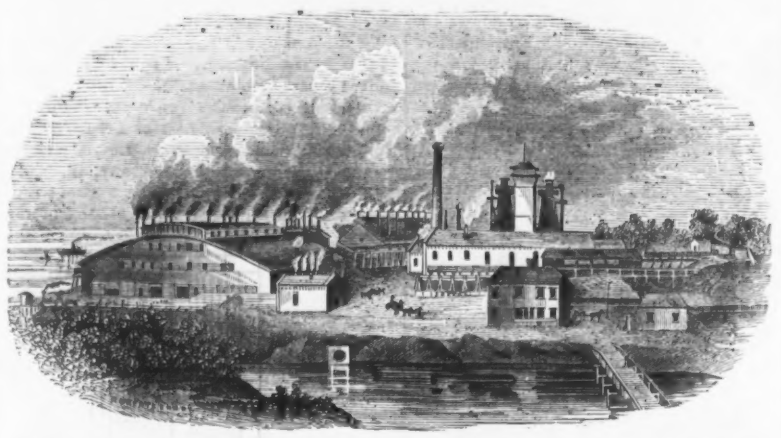

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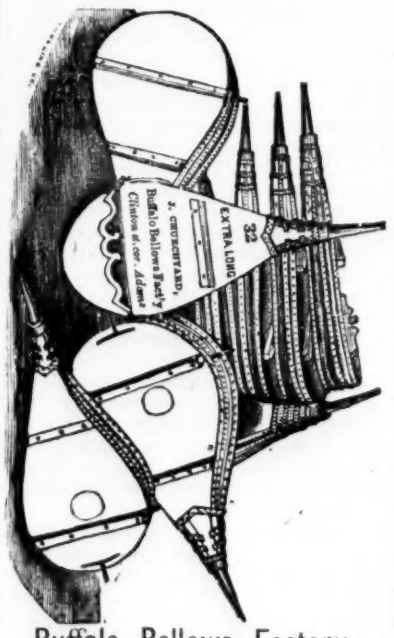

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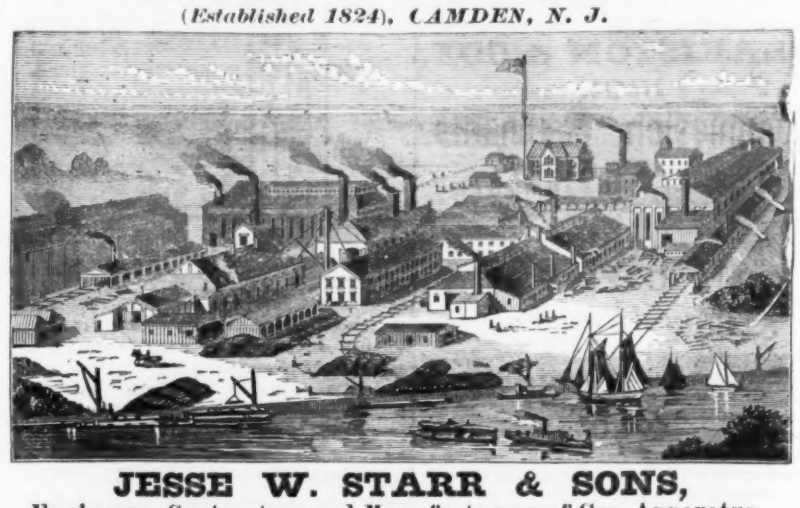

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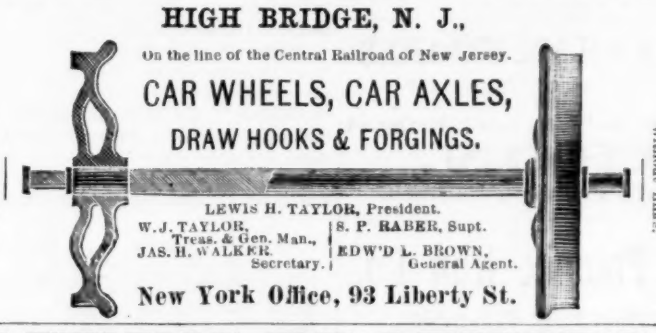

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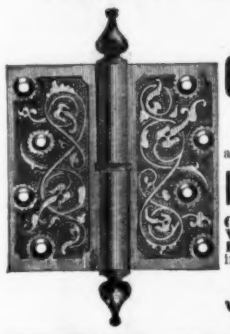

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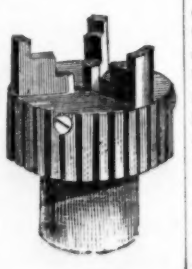

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Evidences as to the Very Early Use of Iron.

BY ST. JOHN VINCENT DAY, C.E., F.R.S.E.

The more extended our inquiries become concerning the state of some, at least, of the arts in ancient times, so have they always resulted in indicating an ever increasing rise toward excellence in the ultimate product, in proportion as the examples cited belong to ages more remote from our own times. This assertion may, doubtless, be questioned by some; yet, as a point upon which those who have investigated high archæology appear to be agreed, that just mentioned seems to stand out as settled.

Many proofs of this may be found, but it is sufficient to signalize at present one or two—such as the architecture and sculpture of Proto-Egypt, Assyria, India and Greece—which, it is well known, have never been equalled in subsequent ages. That the artificers employed in executing the most ancient examples of mechanical execution in Egypt were possessed of iron tools (and, as I shall presently show, almost certainly steel), my former paper was directed in part to prove.

That iron was used by the Chaldeans we have substantial proofs, although the examples which have come down to us are small and few; yet that is not remarkable when we remember the quickly oxidizing character of this metal in comparison with copper, silver, gold, etc. The Rev. Henry Rawlinson, in his "Five Great Monarchies," vol. i., pp. 98, 99, says, in reference to the metallurgy of the Chaldeans: "Metal seems to be scarce, and not many kinds are found; there is no silver, zinc, or platinum, but only gold, copper, tin, lead and *iron*." . . . . "Iron, as already observed, is extremely uncommon, and when it occurs is chiefly used for the rings and bangles which seem to have been the favorite adornment of the people."

When, however, we do find relics of iron manufacture among the ruins of the Proto-Chaldean kingdom, which had its period of chief activity and importance between 2000 and 1500 B.C., few though they be, and doubtless but a part of a large number of original examples lost through oxidation, we are led to infer that these, such as they are, have reached us owing to some peculiarities of position, which have interfered with the natural tendency to rapidity of oxidation attaching to iron.

When the seat of the Mesopotamian empire moved northwestward up the Tigris, and the Assyrians were the ruling nation, the testimony of Layard is conclusive as to their knowledge of the utility of iron. In his other work, Layard speaks still more assuringly as to the degree of skill acquired and the extent to which iron was used by the Assyrians. It would appear that the Assyrians were unable to give elegant forms or pleasing appearance to objects in iron alone, and that, consequently, they frequently combined bronze and iron. Numerous interesting specimens of this nature are included in the collection of the British Museum. Of one of these, a foot of a tripod stand, found at Nimroud, Dr. Percy has made a careful examination: "It was a small casting, in the shape of the fore leg of a bull. It formed the foot of a stand, consisting of a ring of iron, resting on three feet of bronze. It was deeply corroded in places, and posteriorly was fissured at the upper part. A section was made, which disclosed a central piece of iron, over which the bronze had been cast. At the upper part, where it had been broken off, the iron had rusted and so produced the crack above mentioned. The casting was sound, and the contact perfect between the iron and the surrounding bronze. It was evident, on inspection, that the bronze had been cast round the iron, and that the iron had not been let into the bronze; and in this opinion I am confirmed by Mr. Robinson, of Pimlico, who has had considerable experience in broze casting.

	Composition.
Copper.....	88·37 per cent.
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"Some interesting considerations are suggested by this specimen. The iron was employed either to economize the bronze, for the purpose of ornament, or because it was required in the construction. If the former, iron must have been much cheaper than bronze, and, therefore, probably more abundant than has generally been supposed. No satisfactory conclusion can be arrived at on this point, from the fact that bronze antiquities are much more frequently found than those of iron; for the obvious reason that bronze resists much better than iron, destruction by oxidation. Although I think there are reasons for supposing that iron was more extensively used by the ancients than seems to be generally admitted, yet, in the specimens in question, it appears to me most probable that the iron was used because it was required in the construction. And if this be so, the Assyrians teach a lesson to many of our modern architects and others, who certainly do not always employ metals in accordance with their special properties. The instrument under consideration, it will be borne in mind, was one of the feet of a stand, composed of an iron ring resting upon vertical legs of bronze. A stand of this kind must have been designed to support weight, probably a large cauldron; and it is plain that the ring portion should, therefore, be made of the metal having the greatest *tenacity*, and the legs of metal adapted to sustain *vertical* or *superincumbent weight*. Now this combination of iron and bronze exactly fulfills the conditions required. I do not say that a ring of bronze might not have been made sufficiently strong to answer the purpose of the ring of iron; but I do say that in that part of the instrument iron is more fitly employed than bronze."

The feet of certain tripod stands found at Nimroud—these consisting of a circular ring raised upon feet to hold jars and vases—are frequently represented on the bas reliefs. Layard describes the ring of one of them as being of iron, bound in some places with copper, while the feet were partly of iron and partly of bronze ingeniously cast over it. The iron enclosed within the copper has not been exposed to the same decay as that detached from it, and will still take a polish. From the Egyptian character of the designs, Layard suggests that it may be inferred that some of them were not Assyrian, but had been brought from a foreign people, who, he appears, and very satisfactorily, to conclude were the Sidonians and other inhabitants of the Phœnician coast, the most renowned workers in metal in the ancient world, and whose intermediate position between the two great nations, he considers, may have been the cause of the existence of a mixed art among them. It should not be passed over either that, according to Herodotus and Pausanias, the Lydian King Alyattes, who died about 570 B. C., among other offerings dedicated to his god an inlaid iron saucer.

As I have previously dwelt upon the use of iron among the early Egyptians, and have produced both literary as well as material evidence of that use, it is only necessary to cite the conclusion at which Mr. Basil Cooper arrived, in respect of the antiquity of that use by them, from studies of a different order to those which I myself have more particularly pursued. He says: "Turning to Egypt, we find that there, also, as well as on the classical soil of Greece and Rome, the origin of the art of working in iron is pushed back into the mythological and pre-historic age. We have no reason to doubt the testimony of Diodorus, when he repeats that the Egyptians assigned this invention also, as well as all the other more important arts of life, to their great national culture divinity Osiris." This at least implies that it was known amongst them from time immemorial.

I have already shown that the use of iron is identified with the time of erecting the oldest known Egyptian monuments, which, indeed, are by universal testimony proved to be the oldest on the earth; and, in view of the abundant evidence of a high, yet peculiar, civilization prevailing in that land in the remotest age we can fathom, it has by many persons been assumed that most of the arts and sciences were spread therefrom among other peoples.

It is possible—nay, it is somewhat probable—that the knowledge possessed by the Proto-Egyptians of working in iron may have been brought with them from the Mesopotamian plains, whence they traveled westward until finding the Nile Delta for a resting place. Yet, as bearing against that probability, we must remember that in the broad alluvial expanse situate between the Euphrates and Tigris, they had not materials to work in which demanded the use of iron or steel tools, such as they found when meeting with the Mukattam and nummulite limestones, syenites, porphories, diorites, and granites of the Nile valley. Yet, again, as strengthening the probability, we have the well-ascertained fact, that in the same alluvial soil the Proto-Chaldeans, and subsequently to them the Assyrians, practiced the art of working in numerous metals, including iron.

We may now pass down the stream of time to the Greeks, in the records of which people we find striking evidence of their acquaintance with the use and manufacture of iron. Indeed, as characteristic of that one-sided conceit which showed itself prominently through so many phases of the Greek mind, it is not surprising that, terming other nations "barbarians," the Greeks should attribute to themselves the discovery of iron, after the manner handed down to us in the Pelasgic tradition, connecting it with the Idæan Daktyls, professing that that discovery took place on the occasion of the burning of the forest which crowned their native mountain. The date of that conflagration, according to the Persian chronicle and other authorities, is the fifteenth century before the Christian era, or, more precisely, B. C. 1462.

Nor is the foregoing a solitary instance of literary testimony among the early Greeks as to their acquaintance with the metals. The shield of Achilles, described as of such excellent and intricate workmanship in the Homeric style, is another instance. While to Aristotle himself we are indebted for nothing less than an actual account of the mode in which the Greeks made steel in the fourth century B. C., proving them to have been acquainted with iron in the molten state also. The passage has been translated by Mr. Martin Lister, and reads thus:

"Wrought iron itself may be cast so as to be made liquid, and to harden again; and thus it is they are wont to make steel; for the scoria of iron subsides, and is purged off by the bottom; and when it is often defecated, and made clean, this is steel. But this they do not often, because of the great waste, and because it loses much weight in refining; but iron is so much the more excellent the less recrement it has."

Somewhat obscure, no doubt, this Aristotelian passage is; yet when we carefully sift the nature of that which it conveys to us, it is replete with significance, as describing, very briefly and imperfectly, no doubt, what can scarcely be any other than a process of making steel used in Germany, certainly as late as the sixteenth century, that being proved by Agricola, who describes the process thus (*De re Metallica*, lib. ix.): "Make choice of iron that is apt to melt, and get hard, and may easily be wrought with the hammer; for though iron, which is made of vitriolic ore, may melt, yet it is soft, or brittle, or eager. Heat a parcel of such iron red hot, and cut it into small pieces, and then mix it with a sort of stone which easily melts; then set in the smith's forge, or hearth, a crucible, or dish of crucible metal, a foot and a half broad, and a foot deep; fill the dish with good charcoal, and compass the dish about with loose stones to keep it in the mixture of stone and pieces of iron. As soon as the coal is thoroughly kindled, and the dish red hot, give the blast, and let the workman put on, by little and little, all the mixture of iron and stone he designs. When it is melted, let him thrust into the middle of it three or four more pieces of iron, and boil them therein five or six hours with a brisk fire; and, putting in his rod, let him often stir the melted iron, that the pieces may imbibe the smaller particles of the melted iron, which particles consume and thin the grosser ores of the iron pieces, acting like a ferment to them, and making them tender. Let the workman now take one of the pieces out of the fire and put it under the great hammer, to be drawn out into bars and wrought; and then, hot as it is, plunge it into cold water. Thus tempered, let him again work it on the anvil, and break it; and viewing the fragments, let him consider whether it looks like iron in any part of it, or be wholly condensed and turned into steel. Then let the pieces be all wrought into bars; which done, give a fresh blast to the mixture, adding a little fresh matter to it instead of that which had been drunk up by the pieces of iron, which will refresh and strengthen the remainder, and make still purer the pieces of iron again put into the dish; every which piece let him as soon as it is red hot, beat into a bar on the anvil, and cast it hot as it is, into cold water. And thus iron is made into steel, which is much harder and whiter than iron."

The same process was also in use in the Island of Elba as late as A. D. 1683 (Kircher); and this place has been famous from the time of the Roman Empire for the production of steel.

From all the evidence we are led to infer that probably for about 3700 years the production of steel by immersing bars of wrought iron into a molten carburet of iron was practiced among the nations in their progress westward—brought from Egypt, almost to a certainty, by the Greeks—established by them in the Mediterranean countries they occupied—whence it was acquired by the Romans, and by them introduced into their vast western empire.

From what Pliny had observed, and has handed down to us (lib. xxxiv., c. 14), it appears that the Romans in his time (*i. e.* in the earlier half of the first century of our era) were well versed in the practice of steel making by the same process; and seeing that he held the office of Spanish Procurator under Vespasian, it is at least very probable that his observations were made on the mode of manufacture established by the Romans in that country, wherein Toledo has been a famed seat for the production of swords of unrivalled temper and elasticity, from the time of the Romans until now. (I believe I am correct in stating, on the authority of Mr. Cockburn Muir, C. E., who has visited the place, that the Spaniards keep secret at the present time the process by which their steel is made). Toledo is a place well worthy of mention in these inquiries, seeing that the Roman army was provided with steel swords, many of them made here, with which they conquered the greater part of the known world, including these British Isles of ours, under Cæsar, B. C. 55.

When the archæology of India and China shall have been penetrated to its depth, we may hope to arrive at something more definite in respect of the practice in very ancient times of the art of iron making; until that is done much ignorance thereon is inevitable, and in view of what little knowledge we do even now possess, from the sparce nature of the information to our hand, even concerning comparatively late periods, we are led to hope for a great deal when the complete sources of testimony are bared to our vision.

A brief review of what we have already ascertained should be sufficient to convince the most sceptical how ignorant we are of the stages through which metallurgy has passed in the East; and in regard to this state of things Mr. Mallet has so well written, that I cannot do better than quote his *ipissima verba*: "It is strange that of the iron metallurgy of Asia, the motherland of all the arts; of India, the country where, more than twenty centuries ago, King Parus presented to Alexander the Great a *packa*, or wrought bar of Damascene steel, just as Homer's Achilles offered for a prize, at the games of Patroclus, a like valued mass, whence the Greeks obtained the like 'wonder-working sword blades,' where steel dies were employed for coinage when our ancestors were naked savages (I presume Mr. Mallet means "the ancient Britons," who were not our ancestors); of China, whence cast iron hollow vessels now reach us of a combined magnitude and thinness that we have not yet been able to imitate, or even imagine the process by which they have been cast, and razor steel, said to surpass all European steel in temper and durability of edge; less is known than of the iron working of any other part of the civilized world—yet such is the fact.

"Central Asia, and even China, as yet, are nearly *terræ incognitæ;* but India, south of the Himalayas, has been more or less open to European observation for centuries, and has been in our own power for more than one. How little is known of the working of iron in China may be gathered from the bald and imperfect account of it given by MM. Stanislas Julien, Memb. Inst., and Paul Champion, Preparateur au Conserv. des Arts et Metiers, in their work on the 'Technical Arts of the Chinese Empire,' published in Paris in 1869; the first-named author, having a reputation as one of the first Chinese scholars in Europe, and the second being a competent metallurgist and technologist. Yet China possesses the knowledge of working in fluid cast iron, as well as in wrought iron and steel—the first being, at the present day at least, commonly reported to be unknown in India, where wrought iron is made direct from the ore, and steel also."—*Iron.*

The Baltimore and Ohio Railroad Company are building at Newark, Ohio, what are claimed to be the most extensive car shops in the West, and in which they expect to employ 1200 or 1500 persons. Five or six buildings are already completed, and workmen are now engaged in laying the foundation for two or three more.

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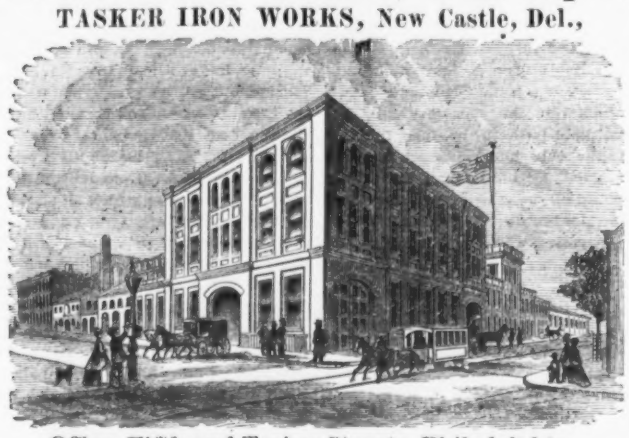

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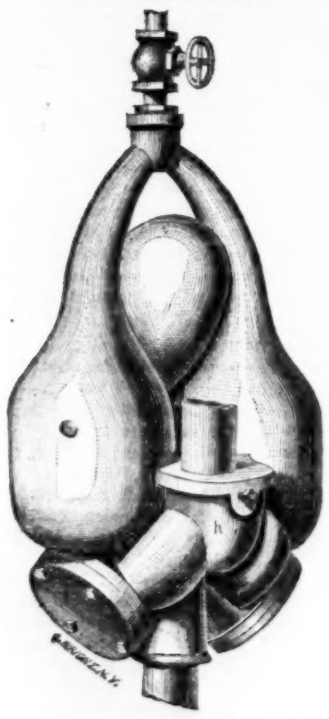

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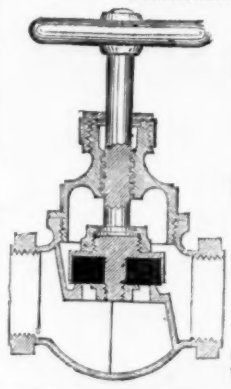

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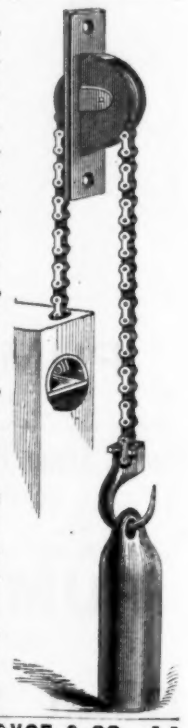

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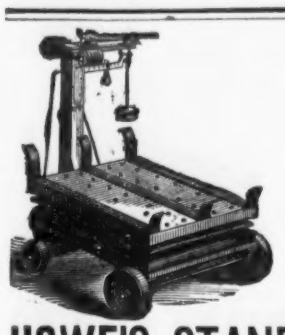

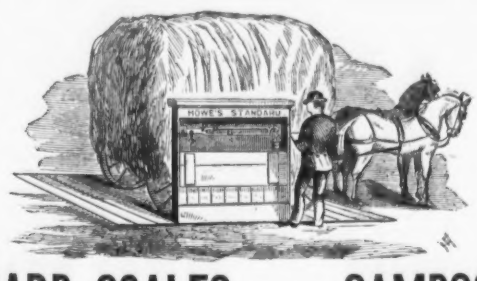

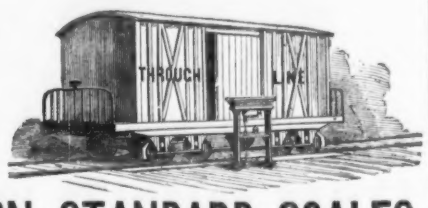

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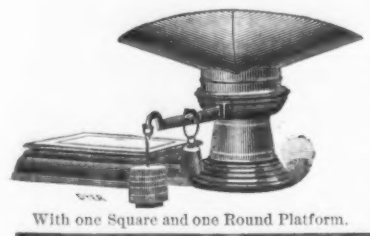

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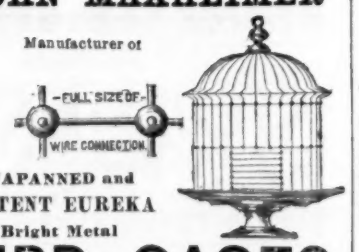

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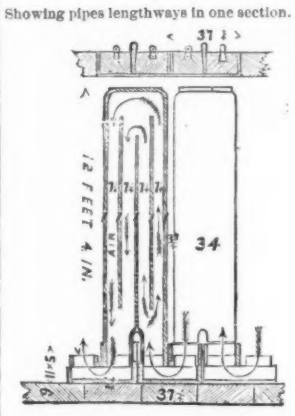
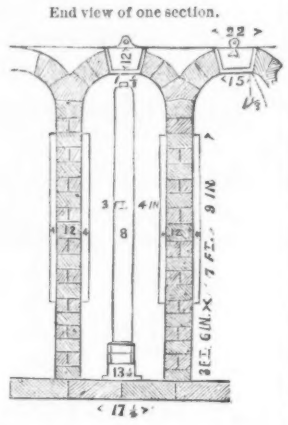


End view of one section.



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In all cases the Cast Iron Key Boxes to form the arch should be filled in lightly with fire-brick blocks, laid dry and covered with loam, or, *better*, a cast iron plate, to cover the top, with a ring in it, so as to be easily removed.

We built our ovens in one block, entirely of *fire brick;* the cost of the brick work entire was about 5000 dollars, say about 1000 for each oven.

We put 4 courses of fire-brick in the bottom, laid on a loose slate rock, laid dry, and well grouted each course with Kaolin grout.

We can recommend the Ford Ovens with great confidence to iron men who wish to construct the best kind of ovens in use in the United States. Yours, truly, J. B. MOORHEAD & CO.

P. S.—Our Furnace is now on her 3d week, making about 28 tons per day good Foundry Iron—15 feet bosh, 50 feet high.

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Messrs. OTIS BROTHERS & Co., New York.

Dear Sirs: The experience of a year proves that ***your Furnace Elevator is superior to all others in use.*** We have in the six weeks from December 1st to Sunday last, 12th inst., made ***2724 tons, 1401 lbs. Pig Metal,*** or an average of near ***65 tons per day,*** which required the elevator to ***lift 72 feet high*** 4½ tons Ore, Coke and Limestone for each ton of metal produced, or ***more than 11,500 tons material in the 6 weeks.*** The largest yield in ***one*** day was ***81 1-4 tons*** Iron, involving the lifting of ***345 tons*** material ***in 24 hours.*** This has all been done to ***our satisfaction,*** and that, too, in the ***coldest weather we have had.*** Other furnaces with ***water*** and ***pneumatic hoists*** have experienced ***great difficulty,*** on account of the ***water freezing*** in the ***tanks;*** and in the case of the ***air*** hoists, we understand that two furnaces, not far from us, ***had*** to ***"blow out,"*** from being ***unable to hoist stock*** during the ***"cold snap."*** The difficulty, we are told, was caused by the ***condensed moisture*** in the ***blast freezing to the sides of the cylinders,*** so that the ***piston could not move*** up or down.

Very truly, yours, DEWEY, VANCE & Co.

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348 Broadway, NEW YORK.

BUSINESS ITEMS.

NEW JERSEY.

The Cummings Car Company, of Jersey City, has been obliged to suspend, in consequence of the difficulty experienced in collecting numerous debts due from railroad companies. The assets of the company will more than cover their liabilities.

It is stated upon reliable authority that the Grover & Baker Sewing Machine Company and the Domestic Company are about to amalgamate, and that several other smaller machine companies will be merged into the new firm. The capital of the Domestic Company, as stated by its officers, is over $1,500,000, and the working capital over 1,000,000. The surplus fund amounts to nearly three quarters of a million. It has been decided to erect a manufactory for this immense concern in Newark, or in some part of Jersey City, and it is believed that Newark will be decided upon, on account of the many superior advantages that this city offers in the way of good manufacturing sites at moderate cost, and accommodation for machines.—*Newark Evening Courier.*

PENNSYLVANIA.

The Pennsylvania File Works, Philadelphia, have built an addition to their works of a two story factory, 25 feet by 55, which will enable them to increase their production so as to meet the wants of the trade. The files and rasps made by this firm have gained a reputation, not only in Philadelphia and New York, but all over the States, as the Messrs. McCaffrey & Bro. are practical mechanics, and claim to turn out none but first-class goods.

The Gibbs & Sterrett Manufacturing Company, Titusville and Corry, was incorporated in March, 1872, and assumed the present title in 1873. The works of this company cover two and a half acres of ground, and consist of a machine shop 75x100 feet; boiler shop, 50x100 feet; smith shop, 50x115 feet; foundry, 45x100 feet; pipe house, 30x120 feet; iron house, 22x100 feet; storehouse, 20x50 feet. 150 men are employed.

The Brady's Bend Iron Works give employment to 600 men, and support a population of 3000 people. The works comprise four blast furnaces, one rolling mill, a machine shop, foundry, firebrick yard and lime-kiln. There are five ore deposits and three coal banks now being operated, the ore mined being 30,000 tons per year. There is said to be sufficient on the territory belonging to the company to last 100 years. The capital of the company is $1,000,000, held mostly by New Yorkers.

Morris, Tasker & Co., of Philadelphia, have built 22 gas-holders this season, beside a number of others which they are constructing for various town and cities. Their immense works at Philadelphia are running night and day, and employ 1500 hands. They are building a new works at Newcastle, Delaware.

The Dickson Manufacturing Company, at Scranton, has reduced its force one-fourth in consequence of the countermanding of several orders for locomotives.

The new Baldwin Furnace of the Pennsylvania Steel Company, 14 foot bosh, for the manufacture of Bessemer pig, went into blast a few days ago and made a good start.

New boiler works have been erected at Sharpsville, by Messrs. Gemmill & Hawthorne. These have greatly increased the facilities of the above company.

The Reading Railroad Company has ordered a suspension of ten per cent. of the men employed in the machine shops, car shops, foundry, forges and other works belonging to them at Reading. None of the men will be entirely thrown out of employment, but in every five weeks they will be one week out of work.

The Titusville Manufacturing Company, successors to Bryan, Dillingham & Co., was formed March 1, 1872. The company manufacture steam engines, boilers, steel jars and oil well supplies, brass goods, etc. The works of this company cover three acres, and consist of a machine shop, 150x100 feet; foundry, 45x120 feet; boiler shop, 60x160 feet, of brick with slate roof; smith shop, 50x150 feet, running 24 fires; brass shop, 50 feet square. They manufacture 300 car tanks yearly, and now have orders on their books for 200,000 lbs. of tankage. The tanks vary from 5000 to 30,000 lbs. each. The company employ 200 men, and the pay roll is $3000 a week. The sales have reached $1,000,000 a year.

The proprietors of the Southwark Foundry, in Philadelphia, having informed their men that wages must be lowered, a strike was the consequence. Negotiations commenced, and at a meeting of the strikers of the Southwark Foundry, held Oct. 15, a report was received that Mr. Morris, the proprietor, was willing to compromise by making the reduction ten per cent. instead of twenty per cent. on the wages of mechanics, and a corresponding reduction on laborers' wages. Upon a vote being taken, 179 voted for resumption, and 101 against it.

MAINE.

One of the few manufacturing establishments of Hollowell is the iron foundry of George Fuller, in connection with which he carries on machine, wood and blacksmith shops. He employs an average working force of 25 hands in the manufacture of various kinds of iron work—steam engines, store fronts, hoisting gear, shafting, pulleys, hangers, machine castings, stoves and general job work. One of his specialties is the manufacture of print-blocks, used in making floor oil cloths, paper hangings, window shades, table covers, woolen carpets, etc. He makes these of all sized and styles, and his experience of twenty years in the business warrants him in promising the highest degree of excellence in his work. In castings he manufactures a very extensive variety, including all kinds used by machinists, hardware dealers and stove manufacturers, and gives special attention to the manufacture of machine castings. The reputation of Mr. Fuller's work is thoroughly established throughout Central Maine, and orders reach him from other distant points.

DELAWARE.

At the works of the Jackson & Sharp Car Company, Wilmington, the most extensive in the city, the force has been reduced from about 800 or 900 to less than 200 men, and last week the wages of the remaining employes were reduced 10 per cent. A similar reduction was made by Bowers, Dure & Co., who have also recently discharged a large number of hands. This reduction being effected, it is highly probable that the business will soon "brisk up," and the employes, such as will come back, re-employed at the new rate of wages.

The Wilmington *Commercial* has the following: "The fact that work is now in progress on two large new rolling mills in this city does not seem discouraging. The contract for building the engines for the McCullough Iron Company's extensive sheet iron rolling mill, at 'The Rocks' on the Christiana, were awarded, some time ago, to the Scott Works, at Reading, and the machinery is now in course of construction. The mills will be two in number, one being 222 feet 9 inches in length, by 82 feet 3 inches. The roof and sides are to be constructed of corrugated iron."

CONNECTICUT.

The Hubbard & Curtiss Hardware Company, of Middletown, has decided to stop work during the present dull times. Wilcox, Crittenden & Co., will run on half time. The Middlesex Plate Company, who have been running night and day, will stop running nights for the present.

The Woodruff Iron Works, at Hartford, are to be run night and day, as the company has received a contract for the engines and boilers for one of the four new steam sloops-of-war. They will receive $175,000 for their work.

Colt's Manufacturing Company, at Hartford, have received a contract for the manufacture of 1050 of the "Universal" job printing presses, which are sold at Rochester, N. Y. The value of the contract is about $500,000.

MASSACHUSETTS.

The Manufacturers' Board of Trade, of Fall River, have voted to recommend a suspension of all the mills two days in each week, and to run only eight hours a day during the other four days for the present.

VERMONT.

A new foundry and machine shop is to be erected at Middlebury, by Messrs. Langworthy & Martin, who have purchased a lot near the depot for that purpose. Their works, when completed, will be run by steam.

OHIO.

The Cincinnati Iron Bridge Works have just completed two important contracts, one a Whipple truss bridge, at Elmira, N. Y., 800 feet long, in five spans of 160 feet each, the iron in which weighs 550,000 lbs., built at a cost of $80,000; the second a steel wire suspension bridge at Franklin, in a single span of 363 feet, at a cost of $44,000. They are said to be very fine structures. In addition to a great number of orders near home, this company is now under contract to erect an iron bridge at Stockport, N. Y., two at Fishkill, N. Y., and one at Bennington, Vt.

The Crestline Lock Works have been in operation four years, and are now under the management of a practical lock maker from the East. They manufacture fifty different styles. Thirty-six hands are employed. Their building is 75x50 feet, and two stories; iron and brass foundry 75x40 feet, all of brick, with iron roof.

MICHIGAN.

A strong effort is being made by the citizens of Dexter to locate car works there, and over $50,000 have been pledged to that purpose.

American Machinery at Paris.

We take the following from the report on moters and machinery at the Paris Exposition in 1867, by Prof. Reuleaux, director of the Industrial Academy, Berlin: "Upon the field of inventions and of inventive genius there were but few highly remarkable achievements present, and among these America held the first rank. Her machine exhibition bore almost exclusively the character of originality, and, although the execution was not generally superior, it contained examples of the highest order of constructive ability and perfect workmanship. France and England offered less original matter—more than both, perhaps, Germany and Switzerland.

"Upon the whole it may be said that in machine industry England has partly lost her formerly undisputed leadership, or that she is at least about to lose it. The healthy young trans-Atlantic industry, which continually withdraws from us energetic and intelligent heads and robust hands, makes, with the aid of her peculiar genius, the most sweeping progress, so that we shall soon have to turn our front from England westward.

"Newly devised motors, forming part of complete machines and models of distinct parts, exhibited as novelties or inventions, were numerous. In the first direction Sellers & Co., of America (Philadelphia), have accomplished the most. The constructions of Sellers, some of which have very rapidly made their way through Germany, bear, in regard to invention, the peculiar, unique stamps of American genius. They are distinguished from us by more direct and rapid conception. The American aims straight ways for the needed construction, using the means that appear to him the simplest and most effective, whether new or old. Our historically heaped up material, and the cautious character of the Germans, are so inseparably interwoven, that among the number of known means we often forget to ask whether they are the simplest, or whether new ones might not be better. The American really constructs in accordance with the severest theoretical abstraction; observing on the one side a distinctly marked out aim, weighing on the other the already available means, or creating new ones, and then proceeding, regardless of precedents, as straight as possible for the object. This spirit is manifest in the Sellers' lathes, shafting and bearings; in their planing machine with diagonal screw shaft; in their screw cutting machine; and it is strikingly prominent in their system of screw threads, which they have boldly placed alongside of the old venerated Whitworth system, in spite of the terror of its numerous adherents, after they had discovered actual deficiencies. A proper valuation of this proceeding contains the most instructive hints for our higher technical institution."

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We invite all makers of improved Machinery and Tools to communicate with us, sending us catalogues and price lists. We shall be pleased to take up and introduce all such goods suitable to this market. Having successfully introduced American Vises, Chucks, Drills, Drilling Machines, Pumps, and a variety of other tools and household utensils, we are confident all good and useful articles will meet with success.

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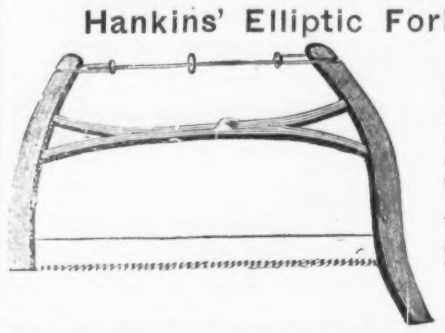
Patented June 28th, 1870.



The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

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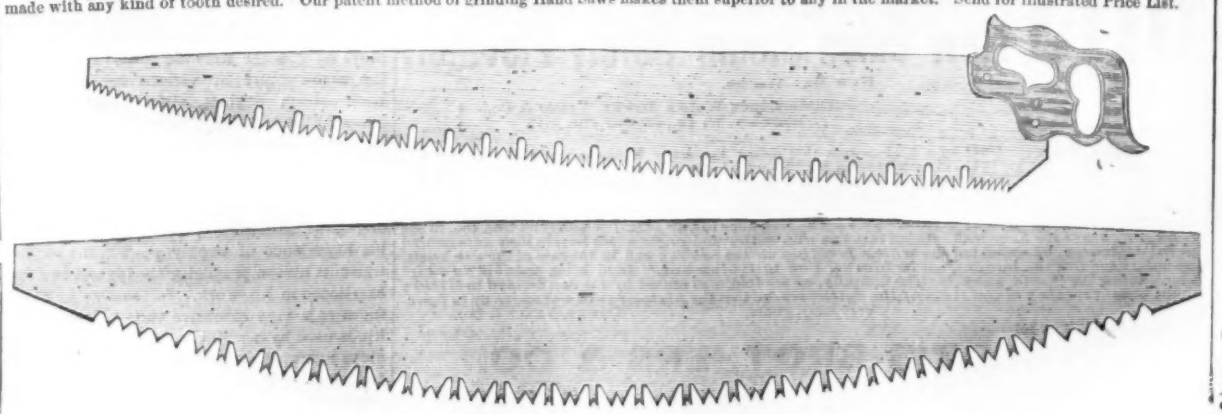

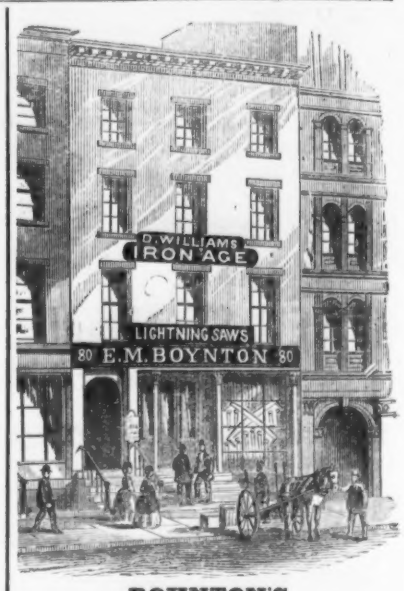

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Under ordinary circumstances, the locating of an iron blast furnace in the business portion of a large manufacturing city, and remote from supplies of ore, fuel and flux, is an enterprise not fit to be undertaken. But the circumstances under which Mr. Stephen Robbins has erected his furnace on the river front in the Eighteenth Ward are not of the ordinary kind, and the points wherein they differ are generally in his favor. His puddling furnaces and rolling mill, already established on the property, had been dependent for pig iron on distant furnaces and an ever changing market. By extending his piers to the port warden's line, he has obtained ample space before the close of navigation by ice, for storing large quantities of ores, coal and limestone, brought by canal barges and other crafts at low rates of freight. Either owning or otherwise controlling ore banks, he regulates the times and the amounts of the shipments to him, while for the filling up of lots from which clay has been dug by brick makers, the grading of streets, the building of piers, in this rapidly improving portion of the city, he will for years have little difficulty in disposing of his slag. Meanwhile attempts will be made to cast it into regular blocks for building purposes.

Landing at the dock and proceeding toward the furnace, we first enter the stock house, 200 x60, where the ores are assorted, and where they, as well as the limestone and anthracite, are convenient to the pneumatic lift, the platform of which ascends near to the rear of the furnace, and carries two barrows at a time. Passing to the right of the furnace we find the hot blast ovens, the boiler room, and lastly the engine room, which fronts on Beach street. Directly in front of the furnace, and facing the street, is the cast house, 40x60, while to the left the cinder is run. The selection of the portion of the lot most remote from the river for the site was mainly dictated by the desire to avoid, as far as possible, the "made ground," and thus secure a permanent foundation.

The furnace is 60 feet high from the hearth line. The external cylindered portion, 32 feet high, rests on a cast iron mantle, which is supported by five cast iron columns, 10 feet high.

The internal lining is of 16 inch fire blocks, backed by a 9 inch course of ordinary fire brick. Outside of this is a 4 in. air space filled with loam, and backed by a 9 in. course of red brick; then a 3 in. air space filled with sand, backed by a 4 in. course of red brick, cased with ¼ in. boiler plate, which extends to the top. The hearth is composed of 16 in. fire blocks. It is 5 ft. deep, interior diameter at bottom 5 ft. 9 in., at top 6 ft. 7½ in. Four 12 in. tuyere holes are cut into the hearth at the following distances from the hearth line, viz.: Watch tuyere 3 ft. 8 in.; front tuyere, 3 ft. 9 in.; two brick tuyeres, 3 ft. 10 in. The depth of boshes 14 ft. 6 in., greatest diameter 14 ft., from which the lining rises, almost as a cylinder, 32 ft., the diameter at that hight being 13 ft. From this plane to the charging plate, a distance of 9 ft. 6 in., the diminution is rapid, the diameter at the plate being 6 ft. 10 in.

The boshes are supported on the outside by H shaped back-stays, 15 in number, one end of each being let into a mortise in the mantle, and the other into a mortise in a flat cast iron ring, at the base or hearth line.

The gases are conducted through a 3 ft. iron pipe directly to the bottoms of the ovens and the boilers. The bell, of the bell-and-hopper, is held in place by a chain attached to a lever, at the other end of which is also a chain passing over a half moon, and connecting with a piston upon which the compressed air from the blowers acts. The piston is in a cylinder at the top of the furnace. When the blast is on the bell is held air-tight against the hopper; when off, the bell drops. There is, therefore, no escape of gas.

From the blowing cylinder the compressed air passes through a 2 ft. pipe to a receiver, 36x 6 ft., placed over the boilers; thence to the ovens, where it attains a temperature of from 900° to 1000° F., and thence to the furnace. Diam. of tuyers 2½ in., mean pressure 6 lbs.

The four boilers are walled in, in couples, with a passage way between the couples. Each boiler has its heater or "mud-drum" attached. Length of boilers 65 ft., of heater 50 ft. Diameter of boiler 3 ft.; of heater, 30 in.

The upright direct acting blowing engine weighs 67 tons, and has the cylinder bolted to the sides of the housings. Diam. of cylinder 44 in., of piston rod 6 in., stroke 4 ft. The blowing cylinder, which has 12 receiving and 12 discharging valves, is 7 ft. in diameter; it has two piston rods, each 4 in. in diam. The two fly wheels are 16 ft. in diam., each weighing 15 tons. The foundation for the bed plate of the engine is of brick, 11 ft. by 8 ft., and the shaft, which is immediately under the steam cylinder, is 1 ft. in diam. and 10 ft. long.

Iron Manufacture in Rhode Island.

A correspondent of the *Tribune*, writing from Providence, R. I., says:

Rhode Island has probably more iron, in proportion to her population, than any other State in our Union, and yet, with some unimportant exceptions, she has never produced any, although ore of superior quality, both magnetite and hematite iron, is found in unlimited quantities in the State. Recently George F. Wilson, of the Rumford Chemical Works, has made some excellent cast steel from the native ores, and he purposes, it is said, to extend the business and to erect furnaces for cast iron. Samples of the steel have just been sent to market. The process is an invention of Mr. Wilson's, whose exertions in this direction may arouse the people to the importance of the subject, though Rhode Island seems exclusively devoted to the manufacture of cotton and woolen goods. Cotton spinning was begun in this State as early as 1790, and water privileges being abundant the business has become a specialty to such an extent that all large expenditures for other than cotton or woolen mills are usually regarded as speculative, manufacturing being considered the only legitimate and staple business for this little State. Three miles from the well-known and thriving town of Woonsocket is "Cumberland Iron Mountain," so called, one of the wonders almost of the State. The mine is three miles east of the line of the Providence and Worcester Railroad, and about the same distance from the Boston and Erie Road. A charter has been obtained and the route surveyed for an independent road to pass the mine, though a branch road can be readily built, or a tram road can be laid. Cumberland Iron Mountain is nearly the highest land in the State, being 550 feet above tide-water at Providence. On clear days Wachusett Mountain and Mount Tom can be distinctly seen from the top of the mine. The rock rises to the very vortex, and can be blasted in almost any direction at a very trifling expense. The whole hill is one vast bed of ore.

There have been many analyses made of the ore; that made by Dr. Chilton, of New York, is below:

Per. and protoxides of iron	58·55	per cent.
Silicic acid	26·33	"
Titanic acid	3·66	"
Lime	·65	"
Magnesia	6·80	"
Manganese	2·10	"
Water and loss	1·91	"
Total	100·00	"

This gives a rather larger percentage of iron than some others; but all the assays have been made from surface rock, and it seems to be a universal rule that all mines grow richer in mineral as they descend. The titanic acid has been considered an objection; but later experiences prove it not to be so; and now we learn that English steel makers have even imported titanic sand from Australia to improve the quality of their steel. The mine has its history, also. During the French war, as early as 1755, the inhabitants of this colony made from the ore from this very mine, mixed with a hematite ore from Cranston, R. I., cannon which were used in the service against the French and Indians, and thus it has aided in carrying out the far-reaching policy of the great Pitt. In 1800, also, cannon were again cast from these ores at Hope, a small village on the Pautuxet River, in this State, for John Brown, of Providence, who had a contract with government at this date to furnish it guns; and, what is singular, the guns were cast hollow, a supposed modern invention, and only a few weeks ago the Society for the Encouragement of Domestic Industry (meaning cotton and woolen goods), to whom has been presented one of these early guns, duly mounted, had it on the fair grounds on exhibition.

At the foot of the mine is a meeting house, with the date A. D. 1700 over the door, the beams and joists of which would to-day be too unwieldy even for ship timber. The gallery of the building, which would be crowded with 100 people, is supported by oak timbers mortised into the frame, which are so huge that they occupy nearly half the interior. I doubt if a California earthquake could ever disturb the serenity of this sacred edifice, which certainly bids fair to defy the tooth of time for many a year to come.

Though Rhode Island people have not appeared to recognize the importance of this possession, still many places, such as Easton, in Massachusetts, which early entered into the production of iron, have regularly carted from this mine their supply, and a large firm in Philadelphia takes thousands of tons annually of this ore.

The British Iron Outlook.

The *Ironmonger* of October 1st, says: Latterly many of our contemporaries, and especially the dailies, have been wailing the loss of our iron trade, and especially regretting that the Americans have been taught to do without our metal and our hardware. But although it is true that the difficulties we have experienced have considerably thrown our usual trade out of gear, it does by no means follow that the British iron trade is on the wane, or that America will not take any more of our wares. The real truth is quite to the contrary, and a solid advance has been once more established in finished iron, while the excellent harvest that has blessed the farmers of the United States has stimulated trade, and sent a stream of orders flowing into the old channels that bring grist to the mill of England's work-shops.

There is no doubt but that American dealers in iron for some time kept back orders, reserving their supplies in expectation that the threatened incursion of American iron manufacturers on English connections would avail to a reduction of prices on this side; but this has been a miscalculation, and the first consequence of the agricultural demand in the United States has been to strip factories to the back-bone, and empty the hardware and agricultural implement shops, thus exposing the fallacy of America being able to supply her own market for manufactured iron, or come into competition with us for those of the world. We do not point, by any means, to a rise in pig iron, although that may follow, but pig iron is a raw material, in the production of which comparatively unskilled labor and the first element, coal, constitute the much larger portion. At present prices pig iron is scarcely worth producing. It is only made as of necessity. But of the price of finished iron coal forms but a slight constituent, and hence, whenever more land is taken into cultivation, or more houses built, or more machinery called into action—as at present in America—the extra demand at once largely affects the price of the manufactured article. This looks like good news that should set our manufacturers and their employes rejoicing rather than despairing; and we hope they will not yet fret about the condition of our iron trade. Things are bad enough, but it does not always do to look on the blank side of the picture, especially when there is anything cheering to look at. It is also well to bear in mind that a new demand has sprung up within the last five years from Russia and South America, as ensuring a permanent future of prosperity to English workmen of finished iron. England possesses, and will for the next half century possess, a virtual monopoly of skilled labor in iron.

We have no fear of that, however, for we know well what Englishmen can and will do when run close. In fact, we are half inclined to think a little rivalry from over the water would do the iron trade more good than harm just now. It would at least tend to discourage the arbitrary action of our workmen, who seem growing unreasonable beyond bounds.

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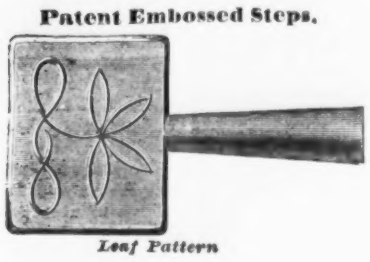
Patent Embossed Steps.

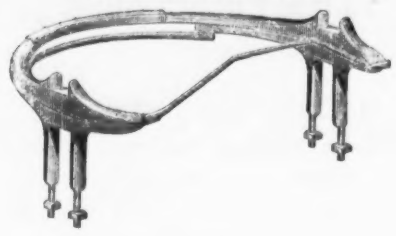


Leaf Pattern

King Bolt Yokes.

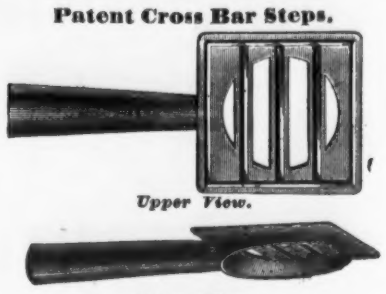
Established 1850.

No. 6 Fifth Wheels.



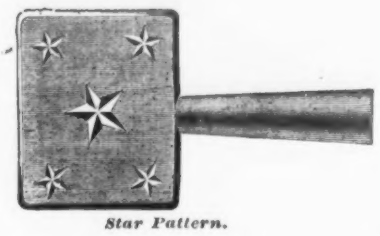
1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.



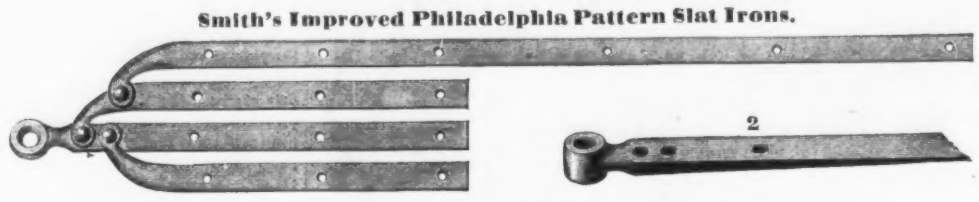
Upper View.

Lower View.

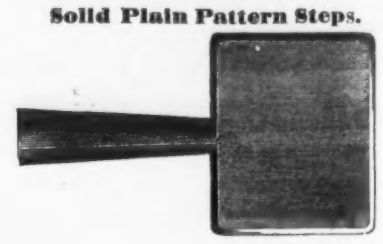


Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



Solid Plain Pattern Steps.



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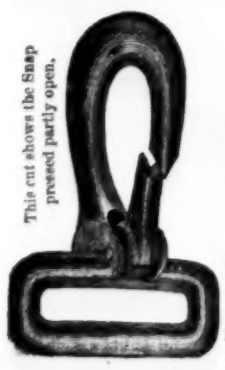

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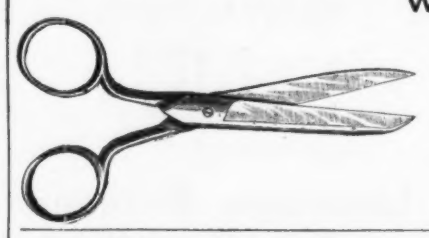

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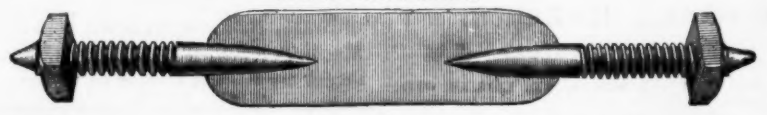

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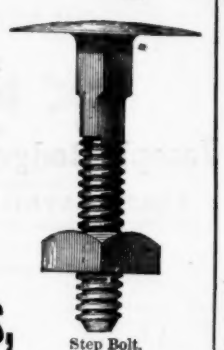

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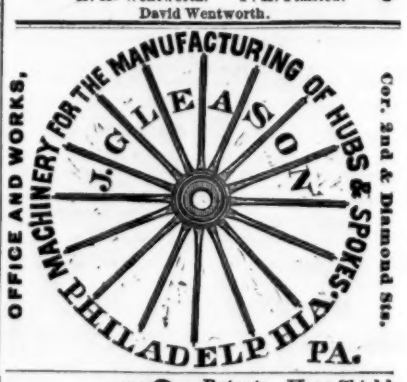

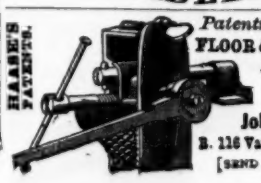

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BANK VAULTS.

The Materials and Methods Employed in their Construction.—Burglar Proof Depositories.

The history of the various efforts which have been made in the past to provide safe places of deposit for valuables has been that of a contest between manufacturer and burglar. As often as the former has supposed himself to have succeeded in defying the latter, so often has the system of thieving been improved to meet the new emergency. And, as a tacit acknowledgement of the uncertainty of any system of bars, bolts, and plates, as a protection against burglars, it has, during late years, become the custom of those who have valuables to protect to leave their stores or offices well lighted, relying on the vigilance of policemen or special watchmen to supplement the precautions of the vault builders. As regards the question of making vaults fire-proof, it must be admitted that we are as yet not so near a solution as in the matter of making them burglar proof. Much progress has been made in this direction, the improvements mostly relating to the employment of non conductive linings for the walls of the vault; nevertheless, it must be doubted whether there is any vault which will resist the action of an intense fire for long periods. In many buildings, as in the N. Y. Stock Exchange, no attempt has been made to render the vault fire-proof, the principal dependence being placed on the fire proof character of the rest of the building.

The introduction of gunpowder among the burglar's agents has led to the devising of means to render its use impossible. The lock having been protected, it is necessary to prevent the burglar from drilling a hole in the wall of the vault itself. Two descriptions of vaults are especially intended to meet this end, the chilled iron, and the welded steel and iron vaults.

The plates for the

CHILLED IRON VAULTS

are composed of two exterior plate of wrought iron, and a filling in between the plates of Franklinite iron. They are generally made about 3 feet wide, and as high as the vault is intended to be. The two wrought iron plates which are on the exterior on each side have countersunk holes, (or holes of a conical form, the greatest diameter being on the outside). The diameter of the hole on the exterior surface of the plate is 1 3-16 inch, and on the inside, 1 inch. The holes are from 4 to 5 inches apart, the distance depending on the width of the plate. The melted iron when poured between the plates runs into these holes and constitutes dovetails, which bind the two plates together. The countersunk holes of each plate are so disposed that those of one plate are not opposite those of the other. These compound plates vary in thickness from ⅝ inch to 3 inches; the wrought iron plates vary in thickness from ⅜ to ⅝ inches, and in the case of the thickest plates are placed 1¼ inches apart. If the chilled iron plate is three inches thick, in addition to the two exterior plates of wrought iron, another is placed half way between the two, which also has been drilled with countersunk holes. The arrangement of metal in this case is, therefore, five layers of alternate wrought iron and Franklinite, the two layers of the latter also communicating with each other through the holes in the central wrought iron plate. The larger diameter of half of the holes in the latter plate is on the side nearest one of the exterior plates, and that of the other half is on the side nearest the other. The holes are thus alternated throughout the plate, first opening toward one plate and then toward the other. This arrangement firmly binds the central plate in position. Sometimes two plates are laid together in the center. Care is taken, also, that the holes in the central plate are not opposite the holes of the exterior plates, the object of this disposition being to prevent the Franklinite iron from extending entirely from one side to the other in any one place.

In preparing these chilled iron plates, the wrought iron plates are first drilled and the holes afterward reamed into a conical shape. Other holes are drilled at the edges, where the angle irons are to be placed in the case of corner plates, or where the battens are to go in the case of side plates; the latter holes are then filled up with wrought iron plugs. In the foundry the plates are clamped firmly to, and at the requisite distance from, each other, and cast iron plates then fixed as a casing outside of the wrought iron plates. The whole arrangement is then lowered into the pit, and the iron run between the plates. The melted metal being surrounded by a metal casing, cools very quickly, and by this chilling process is rendered extremely hard and brittle. It is perfectly proof against the file, and will shatter any drill which may be brought to bear upon it.

When the metal has cooled, the wrought iron plugs, which fill up the holes into which bolts are to be afterward inserted, are knocked out, the plates are put together, and the vault built in the shop, after which it is taken down and sent to its permanent position. The plates are joined at the corners by angle irons, bolted to the plates by bolts with conical heads to fit the countersunk holes in the plates. Six-inch angle iron is usually employed. The plates along the sides of the vault are secured to each other by the aid of battens, which are bolted to the walls; or in the case of very thick plates the latter are joined together with a halving joint. Such plates, it must be borne in mind, contain one or two central plates of wrought iron, and at the junction of two sections of the wall the front exterior wrought iron plate, and the central plate nearest the face plate, are made to extend beyond the rear wrought iron plate and the central plate nearest to it. A countersunk hole is made in the outer plate, and a cylindrical hole in the other, and the two secured together by a bolt and nut.

The chilled iron plate is very expensive, and is not as good a protection as would seem. Although the chilled Franklinite iron cannot be drilled, it is brittle and can be broken by heavy blows from a sledge. To prevent this, an additional wrought iron plate is sometimes put outside of the exterior plate to protect the chilled iron pins or dovetails. In place of this style of vault

THE WELDED STEEL AND IRON VAULT,

is now claiming a great deal of attention. Plates for this description of vault are usually made of seven thicknesses. Beginning at the outside there is one plate of wrought iron one quarter of an inch in thickness, then a wrought iron plate ⅝ inch in thichness, then four plates of welded steel and iron, each ¼ inch in thickness, and finally a ⅝ inch wrought iron plate. The welded steel and iron plate is made by rolling down five layers of steel and iron (three of iron and two of steel), each ⅛ inch in thickness, until the thickness of the whole plate is only ½ inch. The bolts used for this kind of vault are made with a welded steel and iron head, in the following manner: A block of welded steel and iron is first twisted, by which means the two metals composing it are well intermingled; from this twisted block a wedge is then cut. An ordinary iron bolt having been split nearly down to the thread the wedge just obtained is driven in the fork, and the whole combination welded together in a top and bottom tool. The steel and iron are by this means thoroughly mingled in the head, which then has a conical form and fits a countersunk hole. The plates into which these bolts enter are countersunk in such a manner that the conical part of the hole extends generally through the first welded steel and iron plate.

The combination of steel and iron provides a better material to resist the drill, file, punch or hammer, than either of the two metals singly. The steel alone would resist the drill or file but would break under the hammer. The iron is tough and binds together the various parts of the steel so as to resist the blows of the hammer.

THE DOORS

of vaults are generally built of the same material as the vaults themselves. When they have no fire-proof lining they are seldom made over four inches thick, and with the lining have a thickness sometimes of eight inches. A vault is usually provided with two doors with a vestibule between them, the distance between the doors being such that the inner door can only open entirely when the outer door is open. The edges of the door, both on the side of the hinges and of the lock, and on the top and bottom, are rabbeted, and fit into corresponding rabbets in the jamb. This prevents the burglar from making any progress with his chisel between the door and the jamb. Various manufacturers differ as to number and shape of the rabbets, which should be made upon the door, and in some cases the rabbet's surface is even formed into a sort of hook. The outer door is generally attached to the masonry which surrounds the vault.

On the interior surface of the door is the lock frame holding the bolts, which slide into the right and left, and often into the upper and lower, sides of the door frame. Combination locks are used in most instances, the Sargent, Yale, Pillard and New Britain locks being employed to a very great extent for this purpose. Of the four locks just mentioned the first three are operated by means of a dial and the latter by a key.

Very little care is ever taken with the hinges of vault doors, inasmuch as they are no protection to the vault. If the burglars happen to break off the hinges their chance of opening the door is less than before, because the door then rests upon its bolts, and in this case it is almost impossible to open the lock, the only resource then left to the burglar being to blow open the door with gunpowder.

A number of

IMPROVEMENTS IN METHODS OF BUILDING VAULTS

have been devised during the last four years, some of which are very interesting. A great many efforts have been made to employ electricity in such a manner that an alarm might be sounded when the vault was tampered with. In this case a continuous electrical conductor is imbedded in the interior or exterior covering of the vault, which, when ruptured, will sound an alarm. An interesting modification of this principle was devised about four years ago. It was proposed to provide a shield or lining for the vault, consisting of steel strips or springs through which a current from a battery might be conducted. Now, in forcing the vault some strip or spring would necessarily be pressed apart or separated from the adjoining springs or strips, thus breaking the circuit, the instant result of which would be the sounding of an alarm. The inventor proposed also, as a supplementary idea, an elaborate system of telegraphic communication with the police stations, so that, simultaneously with the sounding of the alarm in the building containing the vault, an alarm might be sounded at the police station indicating the house thus attacked. In another case a fluid conductor was suggested. The liquid was to be enclosed in a glass enveloped in the wall of the safe, provided with plugs or ferrules composed of an alloy easily melted. If the glass was broken or, in case of fire, if the plugs were melted, the liquid would escape and the connection would be broken, which would cause an alarm to be rung.

Mr. Lillie, of Elizabeth, proposed a peculiar device, in which the vault is so arranged as to contain, in suitable pipes, chambers or recesses, a quantity of highly compressed or liquefied poisonous gases—ammonia, for instance. The breaking of these pipes or chambers would allow the gas to escape, which is then supposed to extinguish the lives of all present.

In a plan of door proposed by Mr. Wm. Corliss, of Providence, the door is attached to a frame that revolves within the vault, opening inward, and is moved forward or backward by means of screws which hold the door in a closed position by bracing across the interior of the structure.

It has been proposed to provide the vault with a steam jacket, which has a water outlet, steam supply pipe, and, also, a pipe so connected with the hinges of the door that, when the door is opened, the steam will escape through the last mentioned pipe, causing a reduction of pressure within the jacket, which causes a whistle to blow sounding the alarm.

FIRE-PROOF VAULTS

depend generally for their capability of resisting heat upon some non-conducting or refractory lining placed on the interior surface of the walls. Asbestos, from its wonderful fire-proof qualities, seems best suited to this purpose, but it is more frequently employed in mixture with other materials than alone. It is used sometimes in mixture with various earths, or in mixture with earths and chemical salts, such as alum containing water of crystallization, or with earths and inclosing cans or vessels containing steam or gas producing materials. These are the materials used by Mr. Theodore Hyatt, of New York.

An East Saginaw, Mich., inventor recommends the use of hard-wood ashes, alone or mixed with asbestos. Magnesia is also an admirable material for such linings, used either in its uncombined state or in the carbonate, sulphate, silicate, borate, phosphate, or as chloride of magnesium, or in any salt which contains, after roasting, 25 per cent. of magnesia. Any of the materials just named may be mixed with each other, or with lime, dolomite, ankerite, anhydrite, or with kaolin, fire clay or alum. These plans are all protected by patents. Mica walls are also employed as a lining for vaults.

Various plans not dependent on a refractory lining are employed. A plan, for instance, has lately been suggested, in which it is proposed to inclose the safe in an air chamber, the walls of which are provided with apertures and flues, so arranged that when the safe is heated, no matter what may be its position, a current of air is constantly passing through the air chamber.

The largest iron vault, perhaps, on this continent is the safe deposit vault of the Equitable Life Insurance Company. It is 32 feet long by 28 feet wide and 8 feet high. It is composed of welded steel and iron, the plates being 2½ inches thick. The vault is divided by a welded steel and iron partition into two divisions.

The vault of the New York Stock Exchange is 40 feet long by 20 feet wide. In this vault are about 708 safes, arranged in groups of from 12 to 15. Each safe is about two feet square. The nests stand the entire hight of the vault, and the safes are arranged in rows. The main walls of the clusters are composed of chilled iron plates 1¼ inches thick. The partition between the small safes are composed of four layers, two of wrought iron and two of steel. The two exterior plates are of wrought iron, ¼ inch thick; the two interior layers of steel are each composed of strips 3 inches wide by ¼ inch thick; in one layer the strips of steel are laid horizontally, and in the adjacent layer vertically. The partitions are united to the main walls by angle irons. The vault is built of chilled Franklinite iron, and surrounded by a granite wall, one vestibule affording entrance to it.

The bank of North America, now nearly completed, has a small vault, but powerfully protected. It is built of welded steel and iron, and is surrounded by a wall of masonry one foot thick, outside of which is a wall of brick one foot thick. In the brick wall is a vertical cage or network of steel, the vertical bars being circular in section, ⅞ inches in diameter, and 5 inches apart, the horizontal bars being flat, 2 inches by ½ inch in section and 12 inches apart. This is designed to hinder any one from reaching the masonry. To obstruct to a still greater degree the progress of the burglar, cannon balls are inserted between the courses of masonry, hemispherical holes being cut in the upper and lower surfaces of the stones, and the cannon ball extending half its diameter into the upper and lower surfaces of the courses between which it lies. This arrangement renders it exceedingly difficult for one to withdraw a stone from the masonry. On the door of the vault a plate of ¼ inch steel is laid instead of the wrought iron plate which forms the exterior plate of the series before described. Over this steel plate is laid yet another plate of wrought iron to cover the heads of the bolts. The plates which form the doors are six inches wide, and are laid in the successive layers alternately horizontally and vertically.

The vault of the Park bank is also provided with cluster safes, one nest containing 260 apartments.

Wrought Iron Direct from the Ore.

The Wilson Process at Rockaway, N. J.

The process of making wrought iron direct from the ore, as invented and applied by Mr. Wilson, at the rolling mill at Rockaway, N. J., seems to possess many practical merits which adapt it to the manufacture of good iron on any scale, without necessitating the investment of much more capital than is needed to build and equip a rolling mill. Its especial advantage consists in the fact that the apparatus needed for deoxidizing the ore and preparing it for the puddling furnace can be set up in any rolling mill for a fraction of the cost of even a small blast furnace, and that any rolling mill proprietor having access to supplies of ore can thus make his own iron at a minimum of cost, and in such quantities as he may need to supply his mill. From a careful examination of the apparatus at work, and tests of the iron made by it, we are satisfied that it will make good iron as rapidly as it could be puddled and rolled in a mill with furnaces and rolls in proportion to the number of deoxidizers, and if—as we have no reason to doubt—the statements of working expenses given us by the inventor are correct, it can make iron economically.

Mr. Wilson's invention consists in a deoxidizing apparatus in connection with puddling furnaces. The deoxidizer is a vertical cylinder about twelve feet high and twelve feet in diameter, containing sixteen upright retorts, arranged around a central cylindrical chamber, into which the heat of the puddling furnaces is carried and caused to ascend through this and another chamber which surrounds the retorts, after which it descends through flues between the retorts and passes off into the chimney. These retorts have charging doors at the top and delivery doors at the bottom, and by a simple device they may be charged mechanically, while with the opening of the doors below they discharge themselves as rapidly as may be necessary. The charge consists of ore of any kind, reduced to a coarse powder and mixed with fine coal, each retort holding about a ton of the mixture. When the charging is completed the heat of the puddling furnaces is allowed to play around the retorts, which are made of fire brick, and in from sixteen to eighteen hours the process of deoxidation is completed—the oxygen combining chemically with the carbon of the coal, and remaining in such combination until it passes off with the gases of the puddling furnaces. When the ore is in the proper condition, it is drawn from the retorts into buckets and carried to the puddling furnace.

As at first applied, the process was carried on in connection with puddling furnaces of ordinary construction, but it has since been found advantageous to build them with double bottoms. The advantage of this arrangement is found in the fact that it saves fuel and facilitates the process of puddling. The ore, hot from the deoxidizer, is charged into a hopper, from which it falls upon a bottom declining toward the one on which the puddling process is conducted. There it remains until the puddler is ready for a new charge, when it is drawn down upon the furnace bottom proper, having had the advantage of exposure during the meantime to a high temperature. Here it is heated until the cinder melts and the iron comes to nature, when it is balled and carried to the squeezer and rolls. By this arrangement of the furnace bottom the process is made continuous. Mr. Wilson claims to have demonstrated in actual practice that one deoxidizer is capable of producing ore for three puddling furnaces worked night and day, each with a capacity for producing about eight tons of puddled bar in twenty-four hours. The only difference between puddling deoxidized ore and pig iron consists in the fact that the former does not have to be boiled, but comes to nature as soon as the cinder is fused, and that the proportion of cinder is much greater. As it does not have to be stirred previous to balling, the labor of the puddler is much lightened, which is an important consideration, especially in the summer season.

With regard to the economy and advantage of the process as compared with the reduction of ore in the blast furnace, we cannot speak from personal knowledge, not having had opportunity of making the calculations necessary to the formation of opinions to which we should be willing to commit *The Iron Age*. We will state, however, that we see no reason to doubt the correctness of the inventor's claim, that the consumption of coal in the entire process is somewhat less than two tons to the ton of finished iron. On this basis he claims a saving of about 50 per cent. in fuel, as compared with puddling pig iron, beside the difference between the cost of fuel and fluxes used in making the pig in the first place over that of the coal mixed with the ore in the retorts, a portion of which is returned to the puddling furnace unconsumed. It is further claimed that the iron made by this process is superior to that made from the same ores in a blast furnace; also, that the percentage of iron obtained in muck bar is as great as the percentage of pig obtained from the same ore in smelting. A number of experiments were lately made with Mr. Wilson's process, under the supervision of Mr. Bierworth, of Dover, N. J., and Mr. E. M. Grant, of Macon, Ga., by which it was found that hematite ore, assaying 48¾ per cent., yielded 46 per cent., and magnetic ore, assaying 57½ per cent., yielded 52 per cent. of muck bar. A still larger percentage was obtained in some instances, but it was found that a greater yield could only be obtained at the expense of the quality of the finished iron. The experiments were very thorough, with a view to determining the proportion of coal needed to effect perfect deoxidation in the retorts, the number of hours needed to prepare the ore for puddling, the proper temperature of the retorts, the consumption of coal in the furnaces in proportion to muck bar produced, cost of labor, interest, wear and tear, &c., and from the memoranda of the gentlemen making the tests, to which we have had access, we take the percentage above given.

The one important advantage claimed for this method of making iron is the small outlay of capital required. A blast furnace capable of producing 30 tons of pig iron in 24 hours, with all the modern improvements, will cost not less than $200,000. To convert this quantity of pig iron into muck bar will require 15 puddling furnaces, costing at least $18,000, making a total outlay of $218,000 to produce 30 tons of rolled iron per day. It is claimed, on the other hand, that 4 deoxidizers, with 12 puddling furnaces, can be constructed at a cost not exceeding $30,000, while the machinery for grinding the ore and coal can be built for about $3000, making an outlay of $33,000 for a plant capable of turning out 30 tons of muck bar in 24 hours—a saving of $185,000, which is further increased by the greater economy of working expenses. The retorts of the deoxidizer are no more liable to get out of order than the chimney of the puddling furnace would be, and could be repaired as cheaply, while a blast furnace requires costly repairs from time to time, and must be relined at great expense whenever it goes out of blast after a long run, or is chilled from any cause. In conclusion, we would say that while our personal knowledge of the process is limited to the information gained in watching its operations for a few hours, we are satisfied that the inventor has a substantial basis for his claims, and that the invention merits the attention of the iron trade. We hope to present our readers with an illustration of the deoxidizer in a future issue, at which time we shall probably have additional facts for publication, showing the results of its operation through a period of weeks or months.

Statistics of Commerce and Navigation for the Fiscal Year.

The Chief of the Bureau of Statistics furnishes the following synopsis of Monthly Report No. 12, which is now in press. It contains the statistics of our foreign trade for the month ended June 30, 1873, and the twelve months ended the same, as compared with the corresponding periods of 1872:

Periods.	Imports.	Domestic exports. (Specie values.)	Foreign exports.
M'th ended June 30, 1873.....	$19,314,797	$46,215,053	$3,149,101
M'th ended June 30, 1872.....	52,189,527	42,549,444	1,966,562
12 months ended June 30, 1873...	663,410,597	578,938,985	28,148,481
12 months ended June 30, 1872...	640,338,766	501,285,371	22,769,749

The amounts of the foregoing, which consisted of specie and bullion and of merchandise, respectively, during the twelve months ended June 30, 1873 and 1872, were as follows:

	Imports.	Domestic exports. (Specie values.)	Foreign exports.
	1873.	1873.	1873.
Specie and bull'n	$21,480,937	$73,905,546	$10 703,028
Merchandise, ...	641,929,660	505,033,439	17,445,453
	1872.	1872.	1872.
Specie and bull'n	13,743,689	72,798,240	7,079,294
Merchandise.....	626,595,077	428,487,131	15,690,455

The value of foreign commodities remaining in the warehouses of the United States June 30, 1873, was $77,646,579, as compared with $122,211,266, June 30, 1872.

Making allowance for the difference in the warehouse accounts, the imports for the fiscal year ended June 30, 1873, are in excess of the domestic and foreign exports combined, in the sum of $100,887,818, while for the same period of 1872 the excess of imports over exports was only $62,397,039.

The values of the imports and exports carried in American and foreign vessels, and in cars and other land vehicles, respectively, during the twelve months ended June 30, 1873 and 1872, were as follows:

	Imports.	Domestic exports. (Mixed values.	Foreign exports.
	1873.	1873.	1873.
American vessels	$174,536,454	$163,110,634	$8,455,094
Foreign vessels..	471,803,595	478,236,854	16,679,032
Land vehicles....	17,070,548	7,785,075	3,014,355
	1872.	1872.	1872.
American vessels	177,286,302	161,319,869	6,722,462
Foreign vessels..	445,416,783	381,620,692	12,311,355
Land vehicles....	17,635,681	6,279,157	3,735,932

A comparison of the above table shows that during the year ended June 30, 1873, more than 73 per cent. of the total trade by water was in foreign vessels, and for the corresponding period of 1872 the value of articles carried in foreign vessels was about 76 per cent.

The number and tonnage of vessels engaged in the foreign trade which entered and cleared during the fiscal years 1873 and 1872 were as follows:

	Entered.		Cleared.	
	No.	Tons.	No.	Tons.
	1873.	1873.	1873.	1873.
American vessels..	11,266	3,612,631	11,559	3,756,564
Foreign vessels...	20,379	8,083,087	20,493	8,665,131
Total	31.645	11,695,718	32,052	11,821,695
	1872.	1872.	1872.	1872.
American vessels..	10,624	3,711,846	10,492	3,682,309
Foreign vessels...	18,657	7,094,577	18,759	7,051,425
Total	29,281	10,806,423	29,251	10,733,734

As some four or five months will elapse before the annual report on commerce and navigation for 1873 is printed and bound, it is the intention of Dr. Young to furnish further details relative to our foreign trade from the advance sheets of Monthly Report No. 12.

EXPORTS OF PETROLEUM, 1861 to 1873.

We have obtained the following statistics of the exports of petroleum from the United States to foreign countries, from Messrs. Peter Wright & Sons, Philadelphia, and other authoritative sources:

			Gallons.
Exports from United States in		1861.....	1,512,476
"	"	1862.....	10,887,701
"	"	1863.....	28,250,721
"	"	1864.....	31,872,972
"	"	1865.....	29,905,523
"	"	1866.....	67,430,451
"	"	1867.....	67,052,620
"	"	1868.....	99,281,750
"	"	1869.....	102,748,604
"	"	1870.....	141,208,155
"	"	1871.....	155,613,064
"	"	1872.....	150,162,419
"	New York, from Jan. 1 to July 18, 1873, and from other ports to July, 1873.....		107,413,919

The shipments for the first half of 1873 are 900,000 barrels in excess of the shipments for the same period in any previous year, and if the last six months of 1873 show an increase even one-third as great as during the first half of the year, the total shipments for 1873 will be about 5,000,000 barrels.

It will be observed that the shipments in 1871 were 155,613,064 gallons, and in 1872 only 150,162,419 gallons. The falling off in the latter year, when an increase was naturally to be expected, was the result of a combination of refiners and producers to advance prices, which was so far successful as to cause a temporary stoppage of exports. The trade commenced in 1861.

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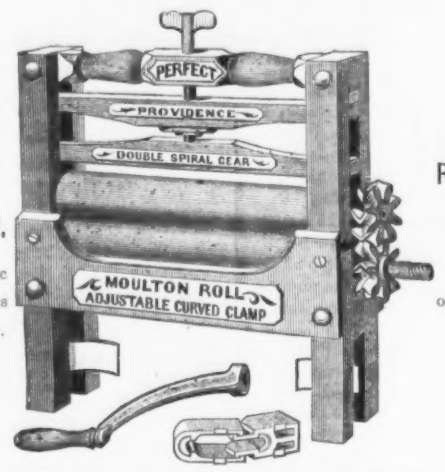

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NO WEAR OUT.
HINGE CLAMP.
Covers more surface on all kinds of articles than any in market.

ALL WHITE Rolls, Double Cogs, V Shape.
Cannot be thrown out of gear on either end.

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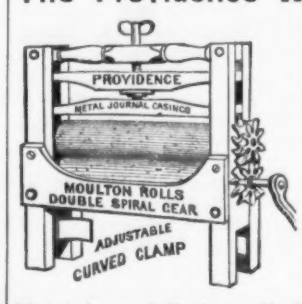

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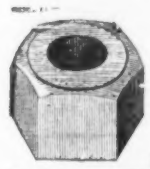

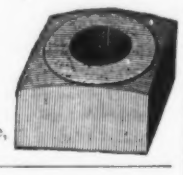

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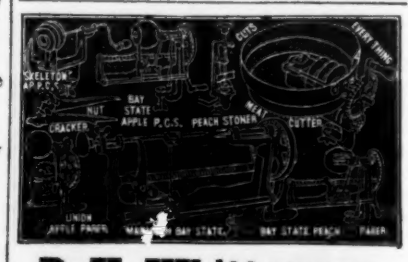

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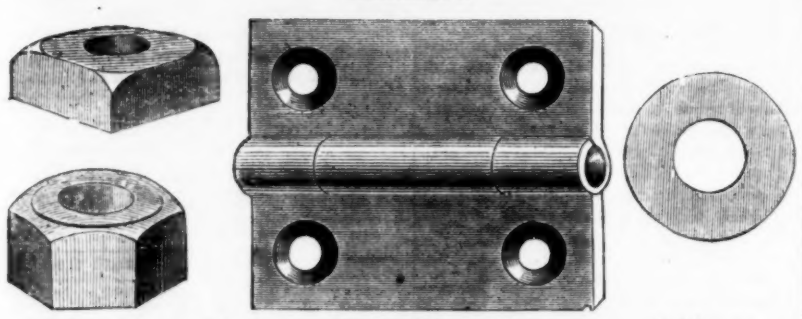

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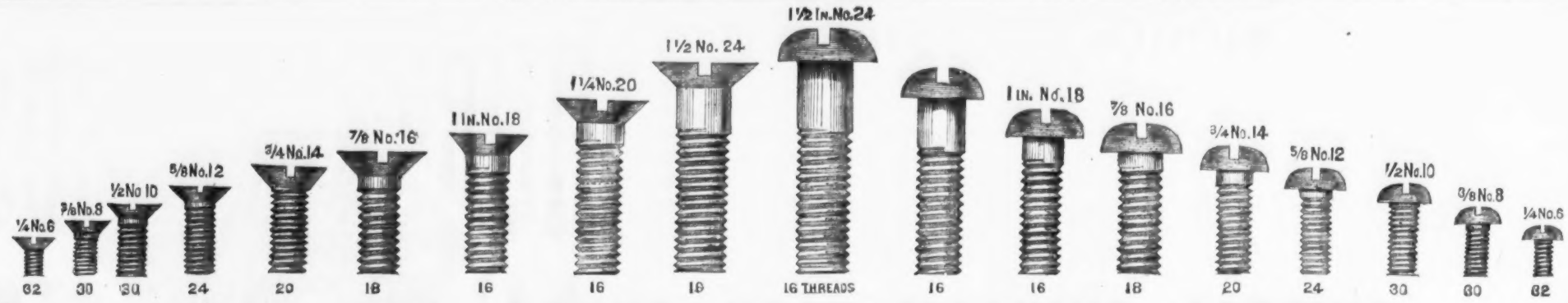

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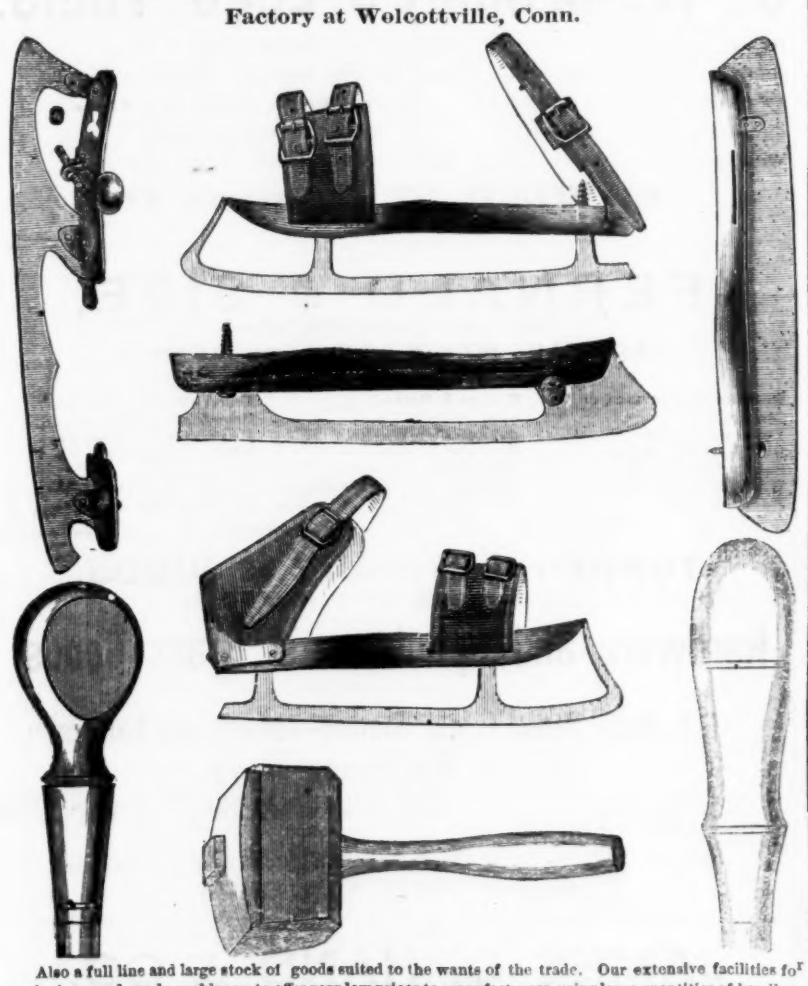

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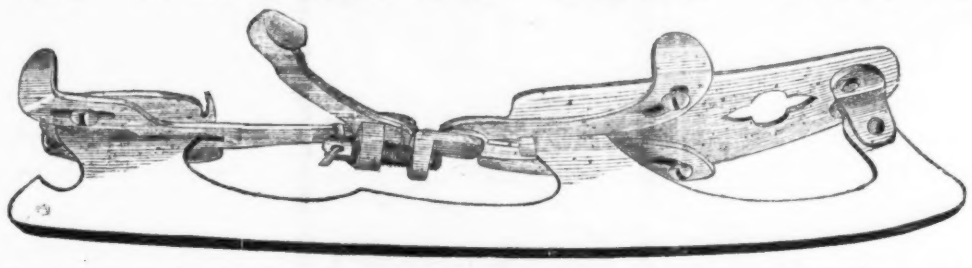

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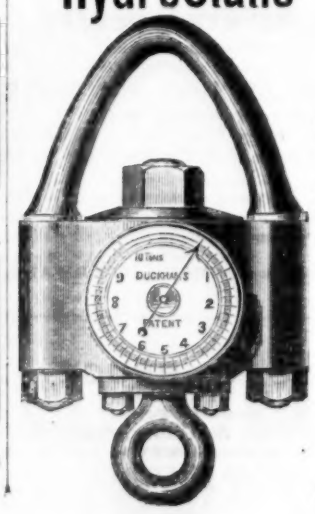
Hydrostatic Weighing Machines AND DYNAMOMETERS,



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(SECOND.)—For ascertaining the correct weight of materials before, and continuously during manufacture at the furnace, cupola or forge.
(THIRD.)—As a Dynamometer, to test the strength of Anchors and Cables; the strain on Ropes or Structures; the power of Machinery; the Traction Power on Land and Towage Power at Sea.

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On receipt of the price we will ship them, safely put up, by any express line or to any New York house to be packed. They are too large to be sent by mail.

THE NICHOLSON FILE.

All Nicholson Files are cut with the Patent *Increment Cut*, an invention owned and controled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

NICHOLSON FILE COMPANY,
Providence, R. I.

CAUTION.

It has just come to our knowledge that certain parties in the West are engaged in buying up WORN OUT FILES of our manufacture, and, after immersing them in an acid bath, selling the same in packages which have a label of the same color and general appearance as ours, and falsely stating as follows:

NICHOLSON FILES,
Providence, R. I.
Increment Cut.
Made from Best English Steel, &c.

Our friends and the public are cautioned against this deception, which we consider one of a most injurious character, not only to ourselves, but to all dealers and consumers who desire the

"NICHOLSON" FILES

as we produce them, as files so treated are comparatively valueless for use.

We have taken steps to have the parties thus engaged in deceiving the public, and trading upon our reputation, presented to the Courts for treatment, and will thank our friends having information bearing upon this subject to notify us, promptly, of any parties who have sold, or are offering for sale, "Nicholson" files doctored and labeled as above described.

Nicholson File Co.,
W. T. Nicholson, Agent.

Providence, R. I., Sept. 25th, 1873.

All packages of NICHOLSON FILES leaving our works bear a label on green paper like the one herewith attached.

1816. *H. F. F.* — *1844.* *H. F. F. & SON.* — *1850.* *P. A. F.* — *1868.* *P. A. F. & CO*

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Steel Wire for Sewing Machine Needles and for other Purposes,
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Jewelers', Engravers' & Mechanics' Tools.

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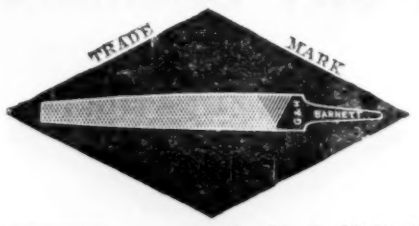

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Made of Wrought Iron or Brass, very superior in quality, and only an auger used in mortising.

EXCELSIOR PAD LOCKS,
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" DIVIDERS,
ALL WITH
STUBS' STEEL POINTS,

Best and Cheapest Goods in the market. Sole Agents for the United States for

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NOBLE MFG. CO., Tools, Ship Augers, &c.
Emery, Waterhouse & Co., Shovels & Spades
We also make a superior
AXE. { *"Queen of the Forest,"* *"Wood Chopper's Pride,"* &c.
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IRON AND BRASS SCREWS, AND WIRE GOODS, RIVETS, &c.,
and assures the trade that his stock, assortment and prices are not equaled by any other parties, whatever their pretentions. NEW YORK, April 1st, 1873.

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HURD'S RAZOR BLADE AXES
MANUFACTURED FROM THE BEST ENGLISH EXTRA CAST STEEL BY THE JOHNSONVILLE AXE MFG. CO.

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Butchers' Cleavers,	Axes and Hatchets,
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Small Brass and Iron Castings made to order.
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MANUFACTURERS OF AMERICAN HARDWARE.

Coes & Taft's Pat. Wrenches.	Mouse Traps. Wire Selves.	Yaw's Cow Bells.
Axe, Pick, Sledge & Hammer Handles.	Scale Beams.	Axes, Picks and Hatchets.
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Steam on the Canal, and its Development.

To the Editor of the Iron Age: Observing in previous issues of *The Iron Age* communications on the subject of steam propulsion on the canal, I am induced to say a few words on a kindred subject, if improving the canal and preparing it for speed can be so considered.

The basis of speed on the canal lies almost entirely in the shape of the boat: for, if it be not prepared for speed by sharpening, no matter what the power or mode of propulsion used, speed on the canal will be but little beyond that of animal towage, and will continue to be an unsolved problem.

Having long since come to this conclusion, through a series of futile experiments, I bent my further investigations in the direction which I thought would not only best accomplish speed on the canal, but at the same time would so develop its capacity that the products of the West would still seek the most natural route to tide water. And the result is the invention by me of a system of gates for the present locks, by the adjustment of which at the proper points therein, I reduce to commercial usefulness all the space now required for the success of the present mitre gates in use—in all about 36 feet—so that the chamber of the locks will be sufficiently long to pass boats measuring 132 feet.

This length will admit of the boat being made sharp, and the application of any of the well-known modes of steam propulsion, giving the boats a speed of three to four miles the hour, and a wheat stowage capacity of 10,000 bushels.

Such speed will double the present average number of trips, rendering 5000 boats able to move 600,000,000 bushels of grain each season.

This, then, is the key to quick, as well as cheap, transit on the canal; as boats thus enlarged and speeded can carry at a much less price, and make more money than previously, because the boat expenses would be just the same, whether making six trips or twelve. By this improvement the State would receive a much larger amount of toll—particularly if it encouraged its canal shipment by a reduction of the toll on grain to one cent per bushel for all the distance, or any distance, it may be carried on the canal.

Such a sensible, expeditious and inexpensive mode of developing the capacity of the canal may not suit those who desire its enlargement to ship dimensions, at a cost of $100,000,000; but it will, nevertheless, answer the purposes of quick transit, beside quadrupling the commerce of the State. R. TAYLOR.

Aerostation.

It is now some weeks since the great Brooklyn balloon collapsed, and the idea of crossing the ocean, wafted by "an eastward current" a mile or two from the earth's surface, remains in abeyance. Had the construction of the balloon and the nature of its appurtenances been fully made known at the outset, the nullity of the project could have been foreto'd with certainty. For cotton coated with varnish enough to render it impervious is, in the nature of the case, too heavy for a purpose requiring the greatest possible lightness, and the buoyancy of coal gas, enough for ordinary spectacular ascensions, is not sufficient in an attempt to solve at once a great scientific question and a mechanical problem of the first magnitude. A silken aerostat, with car of steel rods, and filled with hydrogen, would scarcely have fulfilled all the conditions of possible success; but these considerata, simple as they appear, are yet practically out of reach. As soon as they are procurable, and capital without stint can be employed in their production, undertakings like that of investigating the upper air streams, and of passing from one hemisphere to another, may be attempted with strong probilities of a satisfactory issue. In the mean time the efforts of practical scientists should be devoted, not to enterprises with imperfect means, but to the production of agencies superior to those now available.

As hydrogen is the lightest of known elements, it is also the most tenuous, as shown by the old schoolboy item of its passing through cracks in bottles tight against all other gases, even under considerable pressure. To render a fabric—silk, for example, made as light as consistent with requisite strength—impervious to the passage and consequent loss of the gas, is the first step forward. For such purpose India rubber, good from one standpoint, on account of its elasticity, is, as a matter of fact, worthless, because of its weight; the ordinary varnish gums crack and break, and linseed oil, which on exposure to air oxidates and forms a tenuous and moderately tight coating, fails to fulfill the requisite functions. During the ballooning excitement many years ago, when the famous overland voyage from St. Louis eastward was made, a prominent aeronaut offered a large prize for a varnish suitable for the purpose indicated. It has not been forthcoming, and successful aerostation must bide its time, until a strong silk can be closed to the passage through its fibers of the most buoyant of known gases.

The superior utility of hydrogen gas for aerostatic uses has been known and acknowledged from the very beginning of this pseudo-science, but its great cost, compared to common coal gas, has led to the universal substitution of the latter. But there is much reason to believe that the former may ere long be manufactured at a cost much below that of the product supplied by the city gas mains. This, however, depends upon improvements in industrial operations apparently remote from that under consideration, for the fruits of improvement in one department of applied science are almost always the fertile germs of new growths in the seed fields of others less developed. Given an impervious balloon filled with hydrogen, and a car made of material affording the greatest tensile strength for the least weight, the size of the apparatus, for a given supporting power, will be diminished to an extent now unthought of, and the superfices exposed to counteraction from the atmosphere in any attempt at propulsion will be proportionately lessened.

There still remains, aside from steering, the drawback of ballasting; of throwing out weights in order to rise, and of throwing away gas in order to descend. This necessitates a constant diminution of the buoyant power of the balloon from the commencement of an ascension, and is manifestly a clumsy and unscientific method of management. If heat could be so applied as (without danger of an explosion, such as in 1785 killed de Rozier and Romain with their double hydrogen and fire balloon) to expand the gas, it would answer the same purpose as the throwing overboard of ballast, and if, by some frigorific process, the temperature could be as rapidly cooled, it would subserve the same function as a partial escape of the contents of the balloon. I am aware that this trenches closely upon the realm of pure theory, and that, in actual experiment, a hundred chances might mar or nullify the utility of the idea. But it is only by plausible hypotheses that practical truth is reached at last, and this of expanding and contracting, by changes of temperature, the contents of a balloon, to ensure its ascent and descent, is one of interest, and, perhaps, of value. For the present I rest content with the suggestion; in a future article I may elaborate it further.

Next after this comes the matter of propulsion, capable of subdivision under three heads; the first implying, for success, a thorough knowledge of the drift of the upper air currents, so that the voyager, at different altitudes, may strike different aerial rivers flowing in various directions; the second composing the alternate ascent and descent of a balloon furnished with inclined planes, on the plan of Andrew's machine, tried a few years ago in a crude manner and with indifferent results; the third embracing propellers or wings, the earliest of all projects for aerial propulsion, and which, in numerous instances with small models, and in one or two cases of working machines, has given some slight promise of practicability. Among the last indicated may be mentioned the voyages in England, in 1850, of Mr. H. Bell, who "ascended from Kennington in an aerial machine shaped like an elongated egg, which he propelled by an elongated screw, and steered by an apparatus for nearly thirty miles, and descended safely at High Laner, Essex."

Such, in the very nature of the case, must be the essential steps toward successful aerostation. But it is doubtful whether, for any purpose of mere travel or traffic, its utility will equal expectation. But, for military purposes, its value is as yet undreamed of; and inasmuch as the governments of this and other countries are now busied in testing and perfecting the means of submarine warfare, it would be well if those adapted to the upper air should receive more attention against the time of need.

JAMES A. WHITNEY.

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CHARCOAL IRON.

Parties owning a large and very superior Furnace, 90 miles from Cincinnati, and an unlimited supply of the best Iron Ore, adjoining it, with abundance of timber for making Charcoal, wish to enter into arrangements with men of experience and means to run the Furnace for a term of years, under arrangements to be agreed upon. There is no place in the United States where Charcoal Iron can be made at as low a cost, or where transportation to market will cost less. Apply to

JOHN A. POMEROY,
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A young man desires a situation as manager for a furnace company. Has eleven years experience in the business; best of reference given. Would prefer to go West.

Address **"IRON,"**
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An importer now doing business in this city, who has an experience of over 20 years, wishes to make an arrangement with some out of town house, either in any of the adjacent cities or the West, to act as their agent in this city, and to give his whole time to the purchases and shipments of goods bought here, and the passing of goods imported through custom house. Compensation a stated salary, or a commission, as may be decided upon. Best of references given. Address, *"IMPORTER,"*
Office of The Iron Age, 10 Warren St., N. Y.
NEW YORK, Oct. 16, 1873.

Founder Wanted.

Wanted a founder for a charcoal furnace in the State of Virginia. Must be accustomed to making car wheel iron from brown hematite ores, with warm blast. Address, stating price and references,
"K," Office of The Iron Age,
No. 10 Warren St., N. Y.

TRADE REGISTER
Of Machinery & Kindred Interests.
1873-4.

Embracing a copious index, alphabetically arranged under a profusion of business headings, together with the advertisements of leading firms manufacturing or dealing in Machinery and its kindreds, making a complete and reliable and, consequently, valuable Business Directory of the principal representatives of the various interests kindred to Machinery, *will be sent free of charge to the addresses appearing in the Edition mentioned below.* Thus making it the best advertising medium for anything kindred to machinery ever offered.

An edition comprising a carefully compiled list of over seven thousand five hundred names and addresses, to whom the above edition will be sent free, embracing all the Master Mechanics and Purchasing Agents of Railroads in the United States and Canadas, Car Builders, Bridge Builders, Engine Builders, Locomotive Builders, together with the Constructing Engineers, Contractors of Iron Work, Mining Companies, Owners of Cotton and Woolen, Molding, Planing, Saw and Grist Mills, and other large Manufacturers using Machinery, in all parts of the United States, of good Mercantile standing, and embracing the advertisements as above, will also be issued. Price $10.

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(MERCANTILE.)
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NOTICE.

Our only authorized Agents to collect money for anything connected with our publications will invariably be provided with a letter of authority, specifying the particular object for which it is given, and bearing our official seal, and signed by the Manager.

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4 Warren Street, N. Y.

"ENGINEERING,"

A Weekly Illustrated Journal, edited by **W. H. MAW and JAMES DREDGE.**

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GEO. ED. HARDING, C. E.
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This most successful English Engineering Journal, containing thirty-six pages, weekly, illustrating the latest advances in Civil, Mechanical, Mining and Military Engineering Science, both in Europe and America, can now be obtained by American subscribers, post paid, for $9·30, currency, per year, sent to the New York office of the Journal.

All the important details of the buildings and novel machinery at the great Vienna Exposition will be illustrated and described in *Engineering* the current year; and this, with illustrations of all the larger American engineering structures, will render it invaluable to every American Engineer, Architect, Iron Master and Machinist.

The best medium for advertising American Machinery to the attention of European capitalists.

Send for specimen copy, free.

NEW YORK, July 1, 1873.

Special Notices.

THE ATTENTION OF MANUFACTURERS AND business men is called to the natural advantages of Bristol, Bucks County, Pennsylvania, for a manufacturing site, situate on the River Delaware, with a river front of over one mile, navigable for vessels drawing 15 feet water, 18 miles from Philadelphia, on the line of the New Jersey Division, Pennsylvania Railroad, between Philadelphia and New York, and at the terminus of the Delaware Division of the Lehigh Canal, by which coal and iron are brought to our town cheaper than at any other point between New York and Philadelphia.

Bristol is noted as being a very healthy place, with cheap homes and low rents, good public and private schools, six churches of different denominations, and several manufacturing establishments already established. It contains a population of over 5000, and is constantly increasing in size and population.

Believing that Bristol possesses advantages that few other towns possess, and that the attention of manufacturers need only be diverted in this direction, the Burgess and Council have enacted the following ordinance, viz.:

Be it ordained and enacted, by the Burgess and Council of the borough of Bristol, and it is hereby ordained and enacted by the authority of the same, That all manufactories which shall be erected within the borough of Bristol, during the period of ten years from and after the passage of this ordinance, shall for and during said period be exempted from the payment of borough tax.

Enacted into an ordinance at the Council Chamber, this fourteenth day of July, A. D. 1873.

CHARLES E. SCOTT, Burgess.
Attest: J. WESLEY WRIGHT, Clerk.
BRISTOL, Pa., July 21, 1873.

To Give away to Manufacturers

One or two good Factory Sites, lying along-side of railroad track, within fifty rods of an express station, one-quarter of a mile from steamboat landing, and less than one hundred miles from New York.

For particulars, address,
P. O. Box 119, Guilford, Conn.

Translations and Condensations.

The undersigned, commercial Editor of *El Cronista,* the Spanish Government paper in this city, and Foreign Editor and Translator of the *Daily Bulletin,* has made it a specialty for years past to translate industrial matter, with the strictest adherence to the technical wording, from and into English, German, Spanish and French, for manufacturers, patentees and others, and begs to be recommended to the iron masters and trade in that capacity.

C. KIRCHHOFF, Box 2806, Post Office.

Latest Publications translated by C. KIRCHHOFF. "German Imperial Consular Instructions." "Cuba may become Independent." Officially endorsed by the governments of Germany and Spain.

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CANADIAN BANK OF COMMERCE.

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IRON & RAILWAY CO.
MAKERS OF
STERLING ANTHRACITE PIG IRON
FOR FORGE AND FOUNDRY USE.
A. W. HUMPHREYS, Treas,.
42, PINE ST., N. Y.

Warfords, Robinson & Co., LINE OF 37 BARGES

FOR TRANSPORTATION OF
Lumber, Coal, Iron,
and all heavy freight, between
Troy, New York, Providence,
and all intermediate places.

180 Broadway, WEST TROY,
28 Lumber District, ALBANY,
19 Coenties Slip, N. Y. CITY.

To Furnace Men and Malleable Iron Manufacturers.

For Sale or to Let.—The McHaffie Steel Co.'s Works, at Lamokin, on the P. W. & B. Railroad, at its junction with the Baltimore Central, comprising Foundry, Annealing Furnaces, Machine, Blacksmiths' and Carpenters' Shops, &c., &c. These Works are most eligibly located, and with ample facilities for doing a large business. Parties desiring such property are requested to apply in person at the Works, or by letter addressed to The McHaffie Steel Co.," Chester, Delaware Co., Pa.

MANUFACTURERS

desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at *99 Cannon Street, London, E. C.*

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

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By R. T. Hazell & Co.,

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CASH ADVANCES made on CONSIGNMENTS without additional charge.

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Single copy, $1·00; two or more, 75 cents each.
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GENTS: Have been using your Discount Lists for the past year, and find they save us as much mental labor as our trucks do of physical labor—they save time, labor and money. EVERSON, FRISSELLE & Co.
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The Keeseville Wire Company,
Having discontinued business, offer for sale their
Machinery and Tools, at a Bargain.
Particulars, upon application to
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Keeseville, New York.

Valuable Iron Works, For Sale.

The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,

Brick Pattern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flasks and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools.

The Works can be put in immediate operation A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. ***If not sold in a reasonable time it will be for Rent.***

For particulars apply to
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Any person wishing to engage in the foundry business, may learn an opportunity to purchase new building just erected for said business, all complete and ready to be started without delay or additional expense. A shovel factory adjoining the foundry will furnish a large and regular demand for castings. For further particulars, address,
H. F. A., Box 488, Northampton, Mass

Or said property would be exchanged for unencumbered productive real estate.

FOR SALE.
Machinists' Tools, Patterns, &c.

The Hope Iron Works, Providence, R. I., contemplating a change in their business, offer for a large and valuable collection of Machinists' Tools which have all the latest improvements.

Blacksmiths' & Pattern Makers' Tools

Also a large and varied assortment of patterns more extensive than usually found. They also offer Patterns and Special Tools for the manufacture among others, of the following specialties, which equal, if not superior, to any made:

Hangers, Pulleys and Couplings.
Geared Pumps.
Portable Engines of all sizes.
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Tools and Fixtures for Blacksmiths.
Lathes and Planers.

Many of these specialties would make a business, and are worthy the attention of machine shops and foundries looking for business. Address

JOSEPH P. MANTON, Providence, R. I.

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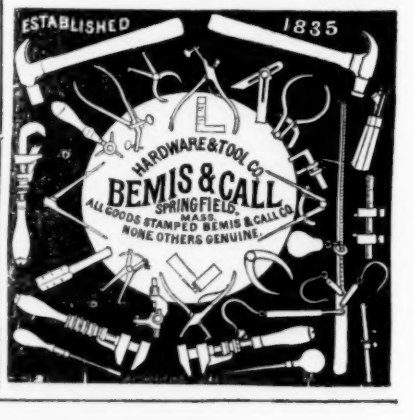

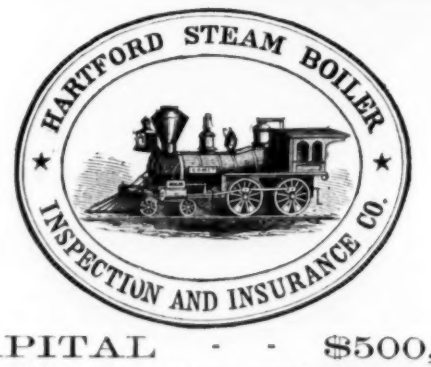

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The Iron Age.

New York, Thursday, October 23, 1873.

DAVID WILLIAMS . . . Publisher and Proprietor.
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CONTENTS.

Rails and Railway Supplies.

To what extent the recent financial panic will injure the iron trade and check the development of our iron manufacturing industries, is a question on which there are wide differences of opinion among those whose views are entitled to respectful consideration. We do not need to tell our readers that we have all along taken a hopeful view of the situation; and now that the panic is over, and we can estimate with approximate accuracy, at least, its effects upon the great productive and distributive industries of the country, we see much to encourage the belief that iron is not so "badly hurt" as at first seemed probable. That there will be a much less mileage of railroad built during the next few years than during the past three or four, is very probable, but it is a mistake to suppose that this necessarily involves a material decrease in the demand for rails, rolling stock and railway supplies, although it will undoubtedly check the rapid expansion of those industries which depend, in a great degree, upon railroad activity for their existence. Our warrant for this opinion is found in the fact that we have in operation at the present time over 70,000 miles of railroad, the greater part of which has already developed a large and increasing traffic. Probably not more than one-third this total mileage of completed railroad is so ironed and equipped that the companies can long remain out of the market for rails and supplies. More than one-third of our present mileage has been built within the past six years, and upon these new roads frequent and extensive repairs are already necessary. A large percentage of this mileage was constructed cheaply, and with a view to improvement as soon as a paying traffic had been developed, and the roads thus included will be the more liberal purchasers before long, for the reason that the high price of pig during the last half of 1872 and the first half of 1873 necessitated the greatest possible economy in the consumption of manufactured iron by the railroads and other large consumers. Many of our railroads are, therefore, in a condition to require large supplies, and however great their present financial embarrassments may be, they cannot long postpone liberal purchases, especially when the additional inducement of exceptionally low prices is offered. With regard to the probable requirements of existing railroads, the *Railroad Gazette*, an excellent authority, says:

During the four years beginning with 1869 we constructed just about 25,000 miles of new railroad, having about 42,000 miles at the beginning of that period. In those four years the report before referred to gives the manufactures of rails in the United States as 2,593,586 tons, and the imports as 1,881,363 tons—a total of 4,474,949 tons. Subtracting the 2,500,000 tons needed for the new lines, we have 1,975,000 tons as the quantity used for renewals in four years. This affords an average of 9·7 tons per mile for renewals, which is seen to be somewhat more than for 1872, as was to be expected, as a much larger proportion of the whole mileage of the country was new in 1872, and therefore needed fewer renewals. Indeed, most of the new roads constructed within the past four or five years have a comparatively light traffic, their aggregate renewals as yet must have been very small, but some of the older are fast getting to the point where they will need large renewals, the more so as a great part of them were laid with the cheapest iron to be had in the market. The figures indicate plainly, however, that the average life of rails throughout the United States during the four years ending with 1872 was more than ten years. Accepting this as the standard for the future, we will need next year something more than 700,000 tons of rails for renewals alone.

It must be remembered, however, that we are not about to stop building railroads for a series of years, as some people, who ought to know better, profess to believe. Our experiences have taught us some valuable lessons, and among them the most important is that we cannot safely stimulate railroad building by artificial means. The granting of State and local aid had done incalculable mischief already, and the system of building speculative railroads upon the proceeds of the sale of mortgage bonds has of itself invited wide spread financial disaster. We shall probably return to the old and safe system of building railroads from the sale of stock, and had we never departed from this system there would be less necessity than now exists for railroad reform, and less cause of complaint that the officers and directors of our railroads are exempt from that close and constant supervision to which they would be subjected were those who furnished the money to build and equip the lines required to take the risk of profit or loss upon their investments, according as the property was managed by those to whom it was entrusted. The bonding system has served a good purpose in some—perhaps many—instances. It was a business expedient essential to the rapid growth of our railroad system, but it has been overdone, the public have lost confidence in the value of such securities, and we must, for the present, rely mainly upon stock subscriptions. How rapid will be our progress in the construction of new lines under such conditions, it is impossible to tell. Probably many roads now in various stages of progress will be carried forward in 1874, and completed as rapidly as possible. Certainly, many railroads now in successful and profitable operation will have to construct a very considerable aggregate mileage of sidings and second or third tracks. With all our railroads, there is still a lack of adequate transportation facilities between the West and the seaboard, and this year our railroads are being taxed to their utmost capacity to move the abundant harvest and return to the West the manufactures and merchandise needed to supply what promises to be a liberal consumptive demand during the coming winter and spring. From the large earnings thus insured the companies will be abundantly able to take advantage of the present favorable condition of the market for finished iron, and the increasing demands upon them will render it necessary for them to increase their capacity in every possible way, and make good without delay the wear and tear of rails and rolling stock under the heavy traffic now passing over their roads. Now, if the figures and estimates we have quoted from the *Railroad Gazette* are trustworthy—and they are based upon the best obtainable statistics—we shall require next year, for renewals alone, an amount of rails within 50,000 tons of the entire production of our rail mills in 1872, and when sidings, additional tracks and new railroads are added—be the demand from the last named source never so small—there will be enough business next year for our rail mills to keep them continuously and profitably employed. We have before given our reasons for believing that the importers, rather than the manufacturers of rails, will suffer from the falling off in the consumption of railroad iron in this country, and this opinion seems to be gaining ground on both sides of the ocean. While, therefore, we have no data upon which to base exact statistical predictions, we fail to discover any good reason for believing that the railway consumption of iron during 1874 will not be great enough to keep our mills busy, and enable them to consume pig iron to an amount fully equal to their average requirements during the past few years. There are no indications of a material decline in the price of British rails, especially as there is a demand from other countries great enough to offset the loss of trade with the United States, and so long as our manufacturers can keep the market to themselves they will not long lack orders. We learn from our exchanges in various parts of the country, that many of the mills which suspended during the panic have already resumed, or propose doing so at an early day, and with the prospect of such modifications in our national banking laws as will secure us an increase of currency in proportion to the commercial requirements of the country, it cannot be said that the outlook for the trade in rails and railway supplies is not full of promise and encouragement.

Lake Superior Iron Exports.

In our issue of August 7th, we stated, on good authority, that certain quantities of Lake Superior pig iron had been shipped direct to British ports. We may have been wrong as to the amount, and our information did not enable us to fix the date or port of shipment, but we believed the fact to be true that Lake Superior iron had been sent abroad, and we stated it as a matter of interest to the trade. As usual, when it encounters a fact of which it is ignorant, or which it does not understand, the Marquette *Mining Journal* contradicted our statement, and asserted that no iron of Lake Superior production had been exported to foreign ports, except such small lots as had been sent to Canada. We then attempted to verify our statements by making private inquiries, but as the information received was contradictory in some respects, we so stated, and called upon the *Mining Journal* to carefully examine the custom house and commission records of Marquette and neighboring ports, that the truth might appear. In response to this request, the *Mining Journal* published a list of shipments to Canadian ports which it claimed to represent the entire export of Lake Superior pig iron since the opening of navigation, accompanying the information with some gratuitous advice which might have been omitted with advantage. Accepting this list as trustworthy, we published it, and admitted that, if the *Mining Journal's* figures were both correct and complete, as it claimed they were, we had probably been misinformed. And now comes the sequel, in the shape of the following, which appears in the *Mining Journal* of the 11th inst.:

In a late article upon this subject, criticising a statement made in *The Iron Age*, in which it was asserted that from 12,000 to 14,000 tons of pig iron had been shipped from Marquette to British ports, we gave a list of the vessels and the amount of pig iron which was taken from Marquette to Canadian ports. This iron consisted of ten cargoes, amounting in the aggregate to 2690 tons. The facts relating to these shipments we obtained from the custom house records, but they do not comprise *all the Lake Superior iron* which has been shipped to foreign ports. A considerable quantity has been shipped from Munising and Bay furnaces, forty miles below Marquette, and more or less from Cleveland, making in all about 7000 tons, from 1200 to 1500 of which went to Glasgow and Liverpool, and the balance to Toronto and Montreal.

It is possible that the claim made by the *Age* may yet prove nearer correct than we thought it, but so far we have been unable to trace more than the quantity above stated as having been shipped to British ports. There are now, however, strong inquiries from abroad for Lake Superior pig iron. It is giving such complete satisfaction, especially for car wheel purposes, that the furnaces have been selling all they could make during the dull season, and now have demands beyond their capacity. English iron merchants are now in correspondence with our furnacemen with a view of arranging for direct shipments next year.

We are much obliged to the *Mining Journal* for this information. It was what we asked for when the question of fact was first raised, and had our contemporary taken the trouble to get all the facts before it ventured to contradict our statements, it would have been spared the trouble of publishing three articles to show that it knew all about the iron movement of the district in which it is published, and one to show that it knew nothing of the subject treated in the other three. We always consider the opinions of *The Iron Age* open to the criticism of such of our contemporaries as have no better use for their columns than to fill them with controversial articles; but we confess that we do not admire the taste of a journal which takes occasion to contradict, flatly and repeatedly, our statement of a fact of which it was ignorant, and which investigation would have shown to be substantially correct.

The Law of Trade Marks.

A case of much interest to manufacturers has lately been decided in the United States Circuit Court of the Eastern District of Pennsylvania, before Judge McKenna. The facts of the case are briefly as follows: For several years past the Lowell Carpet Manufacturing Company have sold their carpets rolled upon hollow wooden cylinders, which in time became a distinguishing mark of these goods, recognized alike by dealers and consumers, and the company adopted it as their trade mark, registering it as such under the Act of Congress of July 8th, 1870. This cylinder was imitated by Messrs. Larned & Starr, carpet manufacturers, who placed their carpets in the market rolled upon cylinders similar to those employed by the Lowell Company. Suit was accordingly brought against them for infringement by the Lowel Company, and the defendants pleaded, in effect, that the cylinder was nothing more than an unpatented device for rolling carpets and removing the spindles in general use among carpet manufacturers; that it was not a device upon which the plaintiffs were entitled to a patent or copyright, they having neither invented nor improved it, nor acquired by any means an exclusive right to its use; and that it was a device which might be employed by the trade in one capacity as well as another. The case was very fully argued on these points, but the court overruled the plea of the defendants, and decided that the wooden cylinder, or "shell," is a veritable trade mark, and that, as such, the defendants are entitled to the protection of the court in the enjoyment of its benefits. An injunction was therefore granted, restraining Messrs. Larned & Starr from further employing it, and the question of damages due the plaintiffs, resulting from the infringement, was referred to a master in equity.

This is one of the most interesting cases of its kind recorded, because of the nature of the plea of the defendants. The point that the particular kind of "shell" employed by the Lowell Company was a device in common use before that company had sought to appropriate it as their exclusive trade mark under the act of Congress referred to, was well taken, and would probably have been accepted a few years ago as a satisfactory answer to the complaint of the plaintiffs; but the argument of the counsel for the Lowell Company was based upon the broad fact, established by abundant testimony, that the "shell" constituted a distinctive and valuable designation, known to the trade as applying exclusively to the goods manufactured by the Lowell Company, and that its use to cover another and a different article, manufactured by a rival company, was a violation of the law of trade marks, and an infringement of the rights of the plaintiffs, entitling them to claim both protection and damages. This argument was accepted by the court, and judgment was rendered accordingly. The law of trade marks has now been pretty clearly defined by this and previous decisions, and manufacturers may enjoy the satisfaction of knowing that they are afforded all the protection in the exclusive use of their registered trade marks which the court can give, and that the trouble and expense of defending their rights and securing damages from those who infringe them, has been reduced to a minimum.

Free Trade in Ships.

The annual report of the Board of Trade of Wilmington, Delaware, after presenting many facts showing the prosperity of the shipbuilding interest of that city, goes on to say that it is generally believed by the Wilmington shipwrights that they can now do very well without any further protection from Congress, "although such legislation seems to be desired very earnestly by the proprietors of new yards in other places, who have not the advantages which experience alone can give." Of course, this is what may be called "buncomb," as the Wilmington ship builders are no more ready for free trade in ships than are those of Chester, New York or Boston, but we object to such a sentiment finding expression in print, especially when published with the official indorsement of a Board of Trade representing the manufacturing industries of a city which has prospered under protection as it never could or would have prospered without it. It is intended to convey a false impression, in the first place, and were it a truthful expression of the sentiments of the Wilmington ship builders, it would be ungenerous and unjust for them to publish the fact, for the information of those seeking to overthrow the tariff system, that the only ship builders seeking to retain our present registry laws are those who are inexperienced in the business, and whose work cannot compare favorably in quality or price with foreign built vessels. The truth is, the Wilmington ship builders would suffer as soon and as seriously as those of any other city from the unrestricted competition of British builders, were their ships allowed American registers; and in pretending indifference to the continuance of the law which requires American shippers to own American vessels or none, the Board of Trade of that city have done a very foolish thing, which will result in more of harm than benefit to the shipbuilders whose superior skill and great experience they have undertaken to advertise.

Have Railroads any Rights?

The United States Supreme Court has now under consideration, and will shortly render decision upon, a case of great importance, and the decision will either affirm or deny, in a general way, the right of State governments to regulate the freight and passenger tariffs of railroads operating within the limits of their respective jurisdictions. The case comes before the U. S. Supreme Court on appeal from the decision of the Supreme Court of the State of Minnesota, which affirmed the constitutionality of an act of the legislature of that State arbitrarily fixing the rate per mile which railroads were permitted to charge for the carriage of passengers and freights, without regard to cost of construction or operation, and prescribing the forfeiture of their charters as the ultimate penalty for the violation of the law by the railroads. We are glad the case has come before the Supreme Court in such a shape, and that the question, "Have railroad companies any rights which State legislatures are bound to respect?" is to be answered by the court from whose decision there is no appeal. It is best that this should be fully understood before the fight between the people and the railroad companies proceeds any further. It is evidently the opinion of people of certain States, especially those in the West, that railroad companies hold their charters subject to repeal at the pleasure of the legislature, and that that body may impose any conditions or regulations it pleases, however unjust or unreasonable, and threaten the companies with the loss of their franchises and the confiscation of their property in case they refuse to comply therewith. This is going a little too far, even in the cause of reform, and it will be to the interest of both parties in the fight now in progress in several States to have the question of the constitutionality of such laws decided by a court above and beyond the reach of any of the political and other influences which have, in so many instances, warped and distorted the opinions of State courts, and rendered it impossible for either the railroads or the people to secure full and impartial justice.

The *Iron Trade Circular* has furnished its readers an illustration of what Dr. Holmes has called "the hydrostatic paradox of controversy," by undertaking to dispute propositions so absurd in themselves that no one of average intelligence would regard them as even barely possible. It says: "We have no sympathy with the vague "rumors that gain credence in the Ameri "can papers, that the masters are insisting "upon a reduction in order that they may "the better deal with the Americans, or that "Americans are fomenting the disputes in "the labor market here with a view of pro- "tecting their own interest in the States." To assert that the American papers have given these rumors credence is to do them an injustice. No paper which is entitled to recognition as even a local authority on matters pertaining to the iron trade, has ever ventured such suggestions. The interests involved in the maintenance of the price of iron in England are too great to admit of the possibility of a trade combination to depress the markets, and it would be scarcely more absurd to suppose that the recent panic in this country had been brought about by collusion between the bankers and the iron dealers, with a view to so far depressing iron that it could be exported profitably to England. As to fomenting disputes in the British labor market, we can only say that we have met persons silly enough to believe that our iron masters were spending money for that object, but our acquaintance with the iron masters themselves is sufficiently intimate to enable us to assert with confidence that they have other and better use for their money than that. The British workingmen are doing us all the good they can of their own accord, and we have no occasion to resort to the means for exciting the labor market there which British manufacturers have employed with varying success for the manipulation of tariff legislation in this country.

Scientific and Technical Notes.

A scientific discovery of considerable importance, if true, is communicated by an American in Paris to a chemist in this country. It consists in

SEPARATING HYDROGEN INTO TWO GASES.

The story is that M. Lebarre, chemist of the silk works of Foedre Brothers, Lyons, succeeded, after a series of experiments, suggested by the investigations of Professor Graham, of the British mint, into the properties of hydrogen, in resolving that gas, hitherto supposed to be a simple element, into two gasses. One of these was absorbed in combustion of palladium in vacuo, leaving a gas that would no longer burn, but, like nitrogen, extinguished flame, and had no color, taste or odor. Its levity is so great that when collected in a hollow copper globe about eighteen inches in diameter and the twelfth of an inch thick, it carried the

globe rapidly to the dome of the Paris Academy of Science building. M. Lebarre calls the new gas "abaron." It has about nine times the elevating power of pure hydrogen, and about twenty-five times that of ordinary illuminating gas, and can be prepared on a large scale at about double the cost of pure hydrogen. With its use balloons can be made of thin sheet iron, and leakages thus effectually prevented. The discovery is of the utmost consequence on scientific grounds, as it suggests the possibility of other supposed "elements" being complex instead of simple, and that our present ideas of elementary principles may be as erroneous as those of the primers of our childhood's study, where "the four elements" were set down, as "earth, air, fire and water." Mr. Lebarre's paper is said to have been read before the Paris Academy of Science, June 30th, in secret session, and its publication postponed until further investigation is made.

In the new edition of "Mitchel's Manual of Assaying," we find an interesting chapter on the

DISCRIMINATION OF MINERALS,

from which we take the following:

The three principal means of chemically testing minerals before the blowpipe with borax, on charcoal, usually with the addition of carbonate of soda, and by holding it in the oxidizing point are then explained, particular care being taken that the exact method of performing the experiment shall be easily understood. The color, it is truly observed, can only be fairly judged in a perfectly transparent bead. If no color can be obtained in the oxidizing point, further experiment with the borax bead is needless, but if a color be obtained it is then advisable to try the effect of the reducing flame on the same bead. The observations and inferences to be drawn from this test are:

Color of the bead in—		
Oxidizing.	Reducing.	Presence of
Green, hot; Blue, cold..	Red.....	Copper
Blue hot and cold.....	Blue.....	Cobalt
Amethyst.....	Colorless.....	Manganese
Green.....	Green.....	Chromium
Red or Yellow, hot..... / Yellow or colorless, cold.	Bottle Green.	Iron
Violet, hot; Red Brown, cold.....	Grey and Turbid, difficult to obtain...	Nickel

It requires some practice before reliable results can be obtained in reducing. He next describes the mode of testing with carbonate of soda on charcoal, and explains the references to be drawn with equal brevity.

Globule	Incrustation.	Presence of
Yellow (malleable)..	None	Gold
White " ...	"	Silver
Red " ...	"	Copper
White " ...	White	Tin
White " ...	Red, hot; Yellow, cold.....	Lead
White (brittle).....	Red, hot; Yellow, cold.....	Bismuth
None.....	Yellow, hot; white, cold.....	Zinc
White, brittle giving off fumes when removed from the flame...	White.....	Antimony

The amount of information here given is, as will be seen, very large, although in so compressed a style; and to show the thoroughly practical character of the chapter, it will suffice to give the few lines relating to the requirements for testing minerals. The requirements already mentioned, it is observed, are blow-pipe, candle, forceps, platinum wire, dried borax, dried carbonate of soda, cyanide of potassium, charcoal, also the minerals for the comparison of hardness—calcspar, felspar, quartz, topaz, sapphire. In traveling it is well to dispense with the grain scales and weights for taking specific gravities. It would be dangerous to attempt to travel with nitric acid. In addition to these it will be found useful to have a steel pocket knife, one blade of which should be kept magnetized, which may be easily done by touching it occasionally with a strong magnet; a small iron spoon for heating minerals, such as cinnabar, over a candle flame; also a small pocket lens.

M. Tessie du Motay, the well-known French chemist, has invented an

IMPROVED SYSTEM OF PURIFYING IRON,

which he thus describes: I proposed to myself the application in the manufacture of pure iron and steel pig iron of all qualities, whether containing separately or in combination, sulphur, phosphorus, arsenic, or silicium. It is known that such pig iron cannot be converted into malleable steel fit for rolling into rails, sheet, tires, etc., either in the Bessemer or other similar apparatus, or in the gas reverberatory furnace. With the object in view I have created the method which forms my present invention, and of which the following are the distinctive characteristics: 1. An apparatus which I call an aerodynamic purifier, which allows to pass through the molten metal, by reason of difference of density, certain fusible chemical compounds which possess the property of taking up the metalloids, which render it impure so long as the action of the air or of oxygen continues in the decarburation of the cast iron, either completely so when it is being transformed with iron or steel, or partially so when the production of fine cast iron is the result. 2. A mode of preparation of cast iron to be treated in my apparatus, or any other of like kind, to ensure the refining shall be carried on without the metal ceasing to be liquid, until the whole of the carbon is completely eliminated. 3. The construction of a special base or scoria containing chemical agents, purifiers whose point of fusion is below that of the temperature of fusion of cast iron, and of less density, and having for its essential object the fusion of the lime contained in the fluoride of calcium, and in the oxides of iron and manganese, this base possessing the quality more than any other of fixing, in presence of fluoride of calcium, sulphur, phosphorus and arseniates, so long as the action of the air or of oxygen continues. 4. The employment of spiegeleisen and ferro-manganese in successive additions to complete the action of the above base or scoria during the passage of the air through the iron which is being decarbureted. 5. The novel employment of the peculiar property of pure ferro-manganese, or of ferro-manganese allied with tungsten and titanium, to render soluble and malleable steel which still contains a definite amount of sulphur, phosphorus, or arsenic, when the melted iron from which they are made shall have been previously completely or almost completely decarbureted, either in the purifying apparatus or in a gas reverberatory furnace. 6. In fine, a process of producing steel indirectly from cast iron containing phosphorus, sulphur, arsenic or silicium, by converting it into fine metal in any suitable apparatus by aid of chemical purifying agents.

The Annual Exhibition of the American Institute.

I.

Although it cannot be said that our annual industrial exhibition, held under the auspices of the American Institute, is altogether creditable to the commercial metropolis of the country, especially when compared with efforts put forth in the same direction by cities of far less population, wealth and importance, it is the only exhibition of the kind we have, and whatever its excellence, as compared with those held elsewhere, it possesses enough of interest to repay occasional, and perhaps frequent, visits. What the American Institute seems to need more than anything else, is active competition from some rival institution managed with greater and more judicious enterprise. Probably such competition would have the effect of stimulating exhibitors, as well as the managers of the Institute, and as the result of a little well sustained rivalry, we should at last have one annual exhibition, at least, worthy of New York as the entrepot of the nation's foreign commerce and the center of a vast and varied manufacturing interest. New York certainly ought to have each year an exhibition of foreign and domestic products more extensive, more varied and more interesting than could be held in any other city on the Continent, and that we have not is scarcely creditable to our commercial enterprise. But in the absence of such an exhibition, the annual "fair" of the American Institute is a feature of our autumn season, and to visit it is almost a social duty. So we all go to see it, and if the number of visitors can be accepted as a correct standard by which to estimate the success of the exhibition, the managers can safely congratulate themselves upon the results of their labors. In any event, they have probably done the best they could, and the responsibility for the scarcity of objects of especial interest rests upon those who have failed, for reasons of their own, to place such articles upon exhibition. Perhaps the financial embarrassments of the past few months have created a disinclination among manufacturers to become exhibitors, and as considerable expense is involved in the exhibition of heavy machinery in operation, it is not to be wondered at that many firms have decided to economize in this direction at the sacrifice of what little benefit they might have gained from sending in their goods.

In its general features the exhibition is much as we remember it in former years, with some improvements. There seems to be a judicious and wholesome restraint upon the tendency of exhibitors of salable wares to advertise their goods, and less of offensive solicitations to purchase goods which are permitted to be sold and delivered. One could wish, perhaps, that the exhibitors of scroll saws were a little less importunate, and that one could examine these machines without being driven away by small boys employed to sell specimens of wood sawing, whose undue zeal in their masters' service suggests a suspicion that their own remuneration depends upon the financial results of their efforts. But as it is, the exhibition gives pleasure and profit to thousands of interested visitors daily, and if it is not in all respects what it might be, it is a great deal better than none at all.

In the department of machinery we notice some novelties, but a great many more of old standbys, which have been so often described in these columns that they need no especial mention at this time. The power is furnished by a well built and finely finished 125 horse-power engine, by Jerome Wheelock, of Worcester, Mass. The chief feature of interest in connection with this engine is the fact that it is provided with Wheelock's steam cylinder packing. This packing is made of cast iron, and the peculiar arrangement of the joints is such that the segments of the ring readily adapt themselves to any irregularities of form in the cylinder, and still remain steam-tight, obviating all necessity of setting-out springs, and making a saving of fuel by materially reducing the friction and waste of steam; and, should a cylinder be worn larger at one end than the other, as is often the case in steam hammer cylinders, this packing will, it is said, adjust itself to the cylinder and work well. Messrs. Hampson, Whitehill & Co. exhibit a small horizontal engine of about 30 horse-power, we should judge, which also helps to drive the shafting. This engine is provided with Shive's governor, and works very well. Among the other steam engines we notice three of Baxter's patent, of ten, five and two horse-power respectively. The latter is nickel plated in every part, and attracts a great deal of attention from its exceeding beauty. There is also a small portable engine, by the Ames Iron Works, adapted to field and farm work.

Of steam pumps there are fewer on exhibition this year than we are accustomed to see, but those that are there are doing good service. Among them we notice a Fairbank's centrifugal steam pump for mines, which raises water from 10 to 300 feet; an Andrews anti-friction centrifugal pump, for mining, manufactory and general use; and Burdon's low pressure steam vacuum pumps, which attract much attention because of their peculiar appearance and novel operation. These pumps are simply cast iron chambers, constructed with valves so arranged [illegible] he pressure of steam is let in directly on the water or substance to be pumped, and it forces out the contents of the pump with just as much force as there is pressure in the boiler—if, for instance, there is 100 lbs. pressure in the boiler, the water in the pump would be forced 200 feet high, thus dispensing with the use of an engine or steam pump. The inventor claims that this form of pump may be used in all establishments where a steam boiler only is employed, being so constructed that the least possible amount of steam, just enough to expel the air from the pump chamber, is sufficient to operate it. The steam, instantly condensing, forms a vacuum, which vacuum causes the chamber to fill with water. When the pump chamber is thus filled the water is held in suspension, and a charge of steam, just enough to destroy the vacuum, is let in, allowing the water so held in the pump chamber to fall out by its own gravity. This is accomplished by the bottom of the pump falling out, or its equivalent, no force being used to expel it, only what may be required to destroy the vacuum. The steam may be used so low that the weight of water so held in suspension will draw vapor enough in to fill the chamber again with water, when condensed.

There are also several sizes of the Pulsometer, large and small, and several hand pumps which pssess no especial features of novelty. The Lane Manufacturing Company show their Monitor Turbine Water Wheel, also a circular saw mill.

Among the miscellaneous exhibits in this department we notice an anti-friction journal, invented by Mr. James Eccles, of Philadelphia, which merits more attention than it is likely to receive, owing to the obscure position in which it is placed. The journal is applied to a grindstone of about four and a half feet diameter, which is turned by a two and a half inch belt, running over the shaft, and not over a pulley. The invention consists in forming gear teeth or cogs on the journal itself, or on the outer bush placed thereon, and gearing them with corresponding teeth formed on a series of rollers, which gear into an annular geared wheel, placed within the journal box. This is an improvement on an invention of a generally similar character, for which a patent was granted to Joseph Harris, in 1848, and seems to meet all the objections heretofore urged against anti-friction shaft bearings. When the journal revolves, the bush rolls on the bearing surfaces of the rollers, which, in turn, roll around the inner periphery of the box. The teeth or cogs of the annular wheel, rollers and bush project nearly one-half their depth beyond the bearing surfaces, and, being geared together, enter into corresponding spaces below the bearing surfaces, the cogs and their spaces forming corresponding shoulders, which prevent lateral motion of the rollers. The width of all the teeth is about equal to one-third the length of the journal, as, when thus constructed, the teeth retain the rollers in line with box and journal without the use of the double rings, cages, or framing heretofore employed. Of course, no lubrication is needed, and from such examination as we have been able to give the device, we are satisfied that it is an invention of practical utility.

Another novelty which merits attention is a machine for dressing stone, invented by Mr. Geo. Stacy, of Nanuet, New York. So far as we know, this is the first machine of the kind which has practically succeeded, and while its inventor does not claim to have perfected it, it already does rapid and effective work, dressing a stone in two minutes as well as it could be dressed by hand in two hours. The cutting portion of the machine consists of a system of chisel edged hammers, arranged spirally on a rotating cylinder, and which are so adjusted as to recoil after striking the stone. This is a great advantage, and admits of doing work which is impossible with machines in which the cutting tools are fixed rigidly to the cylinder. By a peculiar arrangement of the feed motion, the hammers can be made to strike as many times in one place as may be desired. When running under ordinary conditions, the stone receives about 7000 blows per minute, and any kind of stone which can be squared by hand can be dressed by it with perfect accuracy at the rate of about a square foot of surface per minute. We also notice an apparatus for discharging gas retorts by the American Gas Works Construction Co., of this city, which is said to perform the work of 40 men.

Of machine tools there are several fine specimens by the Freeland Tool Co., of this city, and Messrs. Hewes & Phillips, of Newark; a rotary shaper and boring machine and a friction plane by Van Hauzen & Co.; and an index milling machine, gear cutter, spiral cutter and standard milling machine, by the Brainard Milling Machine Company, of Hyde Park, Mass. Messrs. Billings & Spencer show two drop hammers and a sample card of drop forgings. The drops are lifted by narrow strips of hard wood which are run up between rollers. The drops are under perfect control, and will strike a blow of any weight. A Bradley cushioned hammer is also exhibited, but was not in working order at the time of our visit, having just been put in position. Among the other objects of interest in this department may be mentioned the Burleigh rock drill, the Ingersoll steam rock drill, and a Rogers air compressor, built at the Delamater Iron Works. There is also a Blake stone crusher in operation, which is surmounted by a placard making the customary offer of a reward of $50 for a stone which the machine cannot crush. Upon examination, we find that this machine has been much improved by making the jaws in such a manner that, when broken or worn out, they can be replaced by new ones without loss of time, and at an expense of about six dollars. Young's reciprocating Diamond saws attract much attention, though not favorably placed to show their utility to best advantage. We also notice a number of portable forges, one in operation provided with Bayliss's water tuyere. The testing machine exhibited by the Columbia School of Mines, probably the best of its kind ever made, was built by E. & T. Fairbanks & Co., of St. Johnsbury, Vt., and merits the attention of engineers. It is designed to test and accurately determine the strength of iron, steel, copper, brass, zinc, stone, bricks, tiles, cement, morter, cables, springs, wood, and all kinds of building and other materials, whether subjected to transverse, shearing, crushing, or tensile strains. The strains are applied by means of screws, and transmitted through the specimen to the platform of a Fairbanks' scale, so that they can be accurately weighed. One of the most important features of the machine is the arrangement for determining the strain, which was invented by Mr. Miller, of Fairbanks & Co. The small poise on the scale beam is moved by clock work, which will run only when the beam is up, should it fall the poise would stop. By turning the screws sufficiently to counteract the stretching or bending of the material, which may be easily done, the beam may be kept continually balanced until the specimen breaks. The beam must then fall and the position of the poise will indicate the strain. The capacity of the machine is fifty thousand pounds, and is applicable for tensile and crushing strains to specimens of three feet and under, and for transverse to those of eight feet and under. The stretch or deflection of the specimens may be easily told by keeping record of the turns of the screws, which are made to work in unison by means of an endless screw, or worm gearing.

PRICES OF ANTHRACITE COAL FOR FORTY-SEVEN YEARS.

Prices of Schuylkill White Ash Lump Coal by the Cargo at Philadelphia. Averaged Monthly from Mean of Weekly Quotations in Prices Current, Philadelphia. Ton of 2240 pounds. Prepared for the American Iron and Steel Association by Wm. G. Neilson and Israel W. Morris.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	October	Nov.	Dec.	Av'ge for Year.
1826.....	.....	.....	.....	$7 00	$7 00	$7 00	$7 00	$7 00	$7 00	$7 00	$7 50	$7 80	....
1827.....	$7 00	$7 00	$7 00	7 00	.....	.....	.....	.....	.....	.....	.....	.....	....
1829.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 50	7 50	7 25	....
1830.....	7 25	7 25	6 00	5 75	5 75	5 75	5 75	5 75	5 75	5 75	.....	.....	....
1833.....	.....	.....	6 00	5 50	5 25	5 25	5 25	5 25	5 17½	4 87½	4 87½	4 87½	....
1834.....	4 87	4 87	4 87	4 87	4 87	4 87	4 87	4 87	4 87	4 87	4 87	4 87	4 84
1835.....	4 56	4 56	4 56	4 56	4 60	4 63	4 63	4 68	4 88	4 90	5 03	6 47	4 84
1836.....	7 70	7 44	7 31	6 58	5 38	5 50	5 50	6 19	6 41	6 50	7 13	8 05	6 64
1837.....	8 25	8 25	8 04	6 78	5 50	6 38	6 10	6 00	6 00	6 09	6 13	6 13	6 72
1838.....	6 13	5 91	5 28	5 25	5 16	5 13	5 13	5 13	5 10	5 00	5 00	5 00	5 27
1839.....	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00
1840.....	5 00	5 00	5 00	5 00	5 00	4 63	4 63	4 63	4 66	4 95	5 06	5 34	4 91
1841.....	6 40	7 00	6 44	5 88	5 69	5 17	5 13	5 27	5 56	5 63	5 63	5 63	5 79
1842.....	5 63	5 56	5 06	4 38	4 01	3 88	3 83	3 60	3 56	3 51	3 56	3 56	4 18
1843.....	3 50	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 27
1844.....	3 50	3 33	3 10	3 02	3 00	3 03	3 13	3 21	3 26	3 26	3 27	3 26	3 20
1845.....	3 26	3 20	3 27	3 31	3 31	3 31	3 44	3 44	3 59	3 74	3 76	3 81	3 46
1846.....	3 81	3 75	3 73	3 84	3 87	3 97	4 00	3 94	3 96	3 88	4 00	4 00	3 90
1847.....	3 88	3 81	3 81	3 81	3 60	3 63	3 69	3 83	3 95	3 88	3 88	3 88	3 80
1848.....	3 90	3 90	3 58	3 44	3 37	3 29	3 33	3 56	3 46	3 41	3 39	3 36	3 50
1849.....	3 36	3 36	3 45	3 62	3 62	3 86	3 88	3 81	3 75	3 69	3 57	3 50	3 62
1850.....	3 50	3 50	3 40	3 31	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 64
1851.....	4 28	4 13	3 56	3 31	3 10	3 00	3 00	3 05	3 17	3 20	3 25	3 00	3 34
1852.....	3 18	3 47	3 40	3 44	3 44	3 45	3 45	3 50	3 56	3 56	3 56	3 50	3 46
1853.....	3 42	3 44	3 45	3 47	3 47	3 47	3 47	3 64	4 03	4 19	4 19	4 10	3 70
1854.....	4 50	4 50	4 25	4 39	4 81	5 16	5 55	6 00	6 00	5 81	5 68	5 60	5 19
1855.....	5 60	5 28	4 53	4 50	4 50	4 45	4 28	4 19	4 19	4 19	4 15	4 06	4 49
1856.....	4 06	4 25	4 25	4 25	4 05	4 00	4 00	4 00	4 12	4 13	4 10	4 08	4 11
1857.....	3 92	3 92	3 92	3 89	3 85	3 85	3 88	3 87	3 85	3 82	3 82	3 82	3 87
1858.....	3 83	3 83	3 77	3 47	3 23	3 23	3 35	3 25	3 32	3 32	3 32	3 30	3 43
1859.....	3 28	3 38	3 34	3 20	3 20	3 20	3 20	3 20	3 19	3 20	3 34	3 29	3 25
1860.....	3 28	3 29	3 20	3 30	3 23	3 31	3 26	3 39	3 50	3 53	3 62	3 63	3 40
1861.....	3 63	3 63	3 50	3 24	3 23	3 29	3 57	3 40	3 35	3 33	3 33	3 33	3 39
1862.....	3 33	3 33	3 11	2 78	2 78	3 64	4 58	4 85	4 98	5 22	5 50	5 63	4 14
1863.....	5 38	5 25	4 63	4 75	5 50	5 80	6 25	6 50	6 75	7 25	7 50	7 13	6 06
1864.....	7 10	6 75	6 59	7 20	7 88	8 34	9 78	10 75	10 13	8 90	8 88	8 38	8 39
1865.....	8 38	8 38	8 63	8 10	6 75	6 25	6 03	6 50	8 32	9 93	8 81	8 25	7 86
1866.....	7 94	7 75	5 40	5 25	5 13	5 53	5 88	5 68	5 47	5 34	5 25	5 05	5 80
1867.....	5 06	5 06	4 47	4 50	4 44	4 38	4 28	4 07	4 09	4 01	4 00	4 00	4 37
1868.....	4 00	3 13	3 13	3 22	3 25	3 25	3 55	3 25	4 10	4 50	5 22	6 00	3 86
1869.....	5 15	5 01	4 15	3 81	3 90	5 00	6 59	7 17	6 15	6 00	5 87	5 12	5 31
1870.....	5 07	4 79	4 79	4 50	4 50	4 44	4 31	4 44	4 38	4 19	3 69	3 55	4 39
1871.....	4 05	.....	.....	.....	.....	4 52	4 45	4 25	4 35	4 68	4 72	4 63	4 46
1872.....	4 63	3 78	3 58	3 70	63 50	3 50	3 50	3 59	3 71	3 90	3 90	3 90	3 74
1873.....	3 90	3 90	4 00	4 00	4 10	4 20	4 40	4 40	4 50	....	....	....	4 16

Duties Imposed by the Several Tariff Acts on Steel, from 1789 to the Present Time.*

Specific duties were generally imposed on steel in the early tariffs; that of July 4, 1789, making the duty 56 cents per cwt., or one-half cent per pound. Next, on August 10, 1790, it was increased to 75 cents per cwt.; and on May 2, 1792, to $1 per cwt. A reduction on American vessels in the first tariff, and an increase of 10 per cent. if in foreign vessels in the next following tariffs, was applied as well to specific as to ad valorem duties; so that the 56 cents became 50·4 cents in American vessels, and the 75 cents became 82·5 cents in foreign vessels. Also, a peculiar construction was applied to the Act of May 2, 1792, the 10 per cent. increase, if in foreign vessels, being applicable only to the 75 cents, and not to the remaining or additional part; therefore, the duty in foreign vessels, from July 1, 1792, to March 31, 1795, was 107½ cents per cwt. After this last named date, to June 30, 1812, the duty was 100 cents and 110 cents, respectively, in American and foreign vessels.

The Act of July 1, 1812, doubled the duties before imposed, and added 10 per cent. to the addition then made, giving the singular result of 200 cents if in American vessels, and 231 cents if in foreign vessels, per cwt., which rates continued to June 30, 1816, when they were reduced to 100 and 110 cents per cwt., respectively, for American and foreign vessels. The Act of May 22, 1824, does not mention steel; the rates of 1816, therefore, continued until the Act of May 19, 1828, made the duty $1·50 per cwt., the distinction between American and foreign vessels having become obsolete by the admission of British vessels to equality some years before, or soon after 1816. This rate of $1·50 per cwt. was renewed in the Act of July 14, 1832, and it came under the operation of the compromise Act of March 2, 1833, with the probable effect of not being reduced before 1838, nor was it much reduced when the full effect was experienced, and everything was put at 20 per cent. on June 1, 1842. In the Act of August 30, 1842, a distinction was made in steel, "cast, shear and German in bars" being charged $1·50 per cwt., and "all other in bars," $2·50 per cwt. The following tabular statement shows the several Acts and changes of this period:

Act of	Duty on Steel. In American Vessels.	Duty on Steel. In Foreign Vessels.
July (Aug. 1), (*), 1789.....	50·4 cts. per cwt.	56 cts. per cwt.
Aug. 10 (Dec. 31), 1790.....	75 cts. per cwt.	82·5 cts. per cwt.
May 2 (July 1), 1792.....	$1·00 per cwt.	$1·07½ per cwt.
June 30 (July 1), 1812.....	$2·00 per cwt.	$2·31 per cwt.
April 27 (July 1), 1816.....	$1·00 per cwt.	$1·10 (†) per cwt.
May 19 (Sept. 1), 1828.....	$1·50 per cwt.	$1·65 (†) per cwt.
July 14 (March 3, 1833), 1832	$1·50 per cwt.	$1·65 (†) per cwt.
Aug. 30 (Aug. 30), 1842.....	$1·50 & $2·50 per cwt.	$1·65 & $2·75 per cent.

(*) Date of taking effect. (†) Rate in foreign unequalized vessels, many foreign vessels being equalized with our own by treaties after 1816.

The compromise Act of 1833 probably only affected the duty on steel slightly, and in 1841 and 1842 only. The rate would remain at $1.50 per cwt., therefore, for all grades of steel.

July 30 (Dec. 1), 1846, all steel paid 30 per cent. ad valorem.

March 2 (July 1), 1857, all steel paid 24 per cent. ad valorem.

The Act of March 2 (April 1,) 1861, imposed specific duties based on value, making three grades of ordinary bar steel, viz., one at 7 cents per lb. or less, invoice valuation; one above 7 cents, and not above 11 cents; and one above 11c., the last distinction being generally described as "steel in any form not otherwise provided for," paying 20 per cent. ad valorem. The Act of July 14, 1862, added something to each of these rates, and the Act of June 30, 1864, again advanced them, making steel above 11 cents per lb. pay 3½ cents per lb., and 10 per cent ad valorem. These rates and classifications remain in force.

Duty on Steel, in Bars, Coils, Sheets and Ingots.*	Act of March 2, 1861.	July 14, 1862.	June 30, 1864.
Valued at 7c. per lb. or less.....	1¼ cts. per lb.	1¾ cts. per lb.	2¼ cts. per lb.
Valued over 7c. and not over 11c.	2 cts. per lb.	2¼ cts. per lb.	3 cts. per lb.
Valued over 11c. per lb.....	30 per cent.	35 per cent.	3½ cts. & 10 p. ct.
Steel in other forms, n. o. p.....	30 per cent.	35 per cent.	45 per cent.
Steel mfs., n. o. p.....	20 per cent.	25 per cent.	30 per cent.

* Also including steel wire, not less than ¼ inch in diameter.

Much irregularity of practice in regard to the construction applied to the clause "steel in other forms" has existed since the Act of 1864; "shapes" and special forms of steel for particular uses being generally so classed, when not finished manufactures, and also steel bar ends and scrap. The intent of the Act of 1864 was to repeal the provision for "steel in other forms," but the construction applied to it left that clause still operative, and it has been applied as above described, viz., to "shapes" and scrap chiefly, including also steel wire rods less than ¼ inch in diameter. Steel wire, finer than ¼ inch, pays 2½ to 3 cents per lb., and 20 per cent. ad valorem.

* Prepared for the American Iron and Steel Association by Lorin Blodget.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Oct. 22, 1873.

The past week has been characterized by that unsteadiness in the principal financial markets which usually characterizes seasons of recovery from the prostrating effects of a panic like that through which we have lately passed. When our last report was written the stock market was suffering extreme depression, incident to the break in what are known as the Vanderbilt stocks. From this depression there was a steady recovery until Monday, when a reaction took place. The decline was less serious, however, than that of last week, and the market has already pretty much recovered from it. Outside the Stock Exchange a better feeling has prevailed. The banks have done all in their power to restore confidence, and as they have gained large additions to their currency reserves during the week, it is probable they will soon be in a position to resume currency payments in full of all demands upon them. The premium on currency has declined to the nominal rate of 1-16 @ ⅛ of 1 per cent., and during the last few days money could be readily had on call at legal interest, with a fair demand for good commercial paper at from 12 to 15 per cent. In business circles there is a general return of confidence. It is believed that the worst which can befall trade has already come upon it, and that there must be a gradual improvement. Expectations of a good fall trade have been disappointed in almost every instance, but it is expected that there will be considerable activity during November, and that in staple goods of all kinds there will be a better trade than usual during the winter months. The probabilities are, however, that dealers in most trades, especially jobbers, will find themselves with considerable stocks at the end of the year. There is a general complaint among merchants of the difficulty of making collections, but, in most instances, they are able to meet their payments with sufficient promptness to prevent anything approaching a credit panic.

In the gold market there has been no excitement, and the range of the premium was about the same as last week, as will seen from the following comparison of highest and lowest daily quotations:

	Highest.	Lowest.
Thursday	108⅛	107⅝
Friday	108¼	107⅞
Saturday	108⅜	108¼
Monday	108⅝	108
Tuesday	108¾	108¼
Wednesday	108⅞	108⅜

In the stock market the principal dealings have been in Western Union, Lake Shore, New York Central, Wabash and Ohio & Mississippi. The highest and lowest of to-day's quotations of active shares are given below.

The bond market has been dull and somewhat depressed in consequence of the fear that the market would be flooded with bonds returned here from Europe. Railroad mortgage bonds are nominal, and but little effort is now made to negotiate them. The closing prices for governments are given below.

The movements in foreign trade for the week have been as follows:

IMPORTS.

	1871.	1872.	1873.
Tot. for week	$7,115,036	$5,301,197	$4,918,000
Prev. reported	306,590,157	349,830,396	323,195,830
Since Jan. 1	$313,705,193	$355,131,593	$328,113,830

Among the imports of general merchandise for the week are:

	Quant.	Value.
Anvils	264	$3,693
Brass goods	2	225
Bronzes	41	6,525
Chains and anchors	186	8,260
Copper		7,948
Cutlery	48	13,736
Guns	94	9,698
Hardware	74	11,139
Iron, hoop, tons	5	380
Iron, pig, tons	1,367	45,203
Iron, sheet, tons	52	10,586
R. R. bars	12,383	240,289
Iron cotton ties	1,233	4,138
Iron, tubes	335	1,062
Iron, other, tons	786	28,040
Metal goods	529	18,523
Needles	6	1,655
Per. caps	29	5,457
Saddlery	2	555
Steel	3,334	37,446
Tin, boxes	14,102	127,442
Tin, 1696 slabs	129,669	34,856
Wire	784	11,518

EXPORTS, EXCLUSIVE OF SPECIE

	1871.	1872.	1873.
For the week	$5,831,474	$6,114,056	$7,430,526
Prev. reported	183,257,301	177,589,100	230,572,129
Since Jan. 1	$189,088,775	$183,703,156	$238,002,655

EXPORTS OF SPECIE.

Total for the week	$336,429
Previously reported	42,590,044
Total since January 1	$42,926,473

No bank statement has been made for several weeks past, and none is expected until the Clearing House certificates are all retired. Foreign exchange is as follows:

	60 days.	3 days.
Prime bankers' Sterling bills on London	106⅛@106¼	108 @ —
Good bankers' do	106⅛@106⅜	107¾@ —
Prime com. sterling do.	105⅞@105⅞	— @ —
Paris (bankers)	5·33¾@5·35	5·28¾@5·30
Antwerp	5·30 @5·31¼	5·25 @5·26¼
Swiss	— @ —	— @ —
Amsterdam	39⅝@ 39⅝	39⅞@ 40
Hamburg	93¾@ 94	95 @ 95¾
Frankfort	40¼@ 40⅜	40¼@ 40⅜
Bremen	93¾@ 94	95 @ 95¾
Prussian thalers	70⅝@ 70⅞	71¼@ 71½

Government bonds closed as follows:

	Bid.	Asked.
U. S. 1881s, reg	110⅝	111
U. S. 1881, c., large	113	113⅛
U. S. 5-20, 1862, reg	105½	—
U. S. 5-20 1862, c., large	106½	—
U. S. 5-20 1864, c., large	107	—
U. S. 5-20 1865, c., large	108	—
U. S. 5-20 1865, new, reg	109½	110
U. S. 5-20 1865, new, c., large	110½	110⅝
U. S. 5-20 1867, reg	110	110¼
U. S. 5-20 1867, c., large	112½	112⅝
U. S. 5-20 1868, reg	109¾	110⅛
U. S. 5-20 1868, c., large	111¾	112⅛
U. S. 10-40, reg	104¾	105
U. S. 10-40 c., large	106⅝	107
U. S. 5s, of '81, c., large	108⅝	108⅞
30 Year Currency Pacifics	108¼	109¼

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	90⅛	89⅝
Lake Shore	68	67⅝
Rock Island	92⅛	90⅞
Wabash	43⅛	42⅞
Western Union Telegraph	58⅝	57¾
Northwestern	39¾	39¼
Milwaukee & St. Paul	30⅛	30
Milwaukee & St. Paul preferred	64	58¾
Pacific Mail	33¼	32½
Erie	46¼	45¾
Ohio & Mississippi	26	24¾
Union Pacific	18¾	17⅞
C. C. & Ind. Central	21	20¾
Hannibal and St. Joseph	23¼	22½
Consolidated Coal	43	43
Maryland Coal	15¼	15

GENERAL HARDWARE.

Several of our city houses report an improvement in business this week, while others say that orders have fallen off, if anything; and the same discrepancy exists in the reports we get as to the way remittances are coming in. It is very satisfactory to find, however, a universal feeling of confidence in the stability and solvency of the trade in all parts of the country. Merchants and manufacturers are greatly disappointed that so fine a fall business as this promised to be should be so unexpectedly injured, but they feel that the country needs the goods they expected to sell this fall, and a dull business now will make a brisk spring. Some persons whose opinions are entitled to weight look for a decided improvement within a couple of weeks. Merchants ought to make more than usual efforts in such a time as this to pay their obligations promptly. If they have the money to meet the claims upon them they have no right to evade them, and if the country trade could hear the remarks we have on many occasions heard in this city within the past few weeks, they would appreciate better than they do, perhaps, the value of a good name, as well as the opportunity for gaining one that now exists. The way in which people meet their obligations is now very carefully watched, and we have heard many comparisons between old and rich houses who have failed to make their payments promptly, and small houses, making much less pretension, who have met their liabilities like men. We said two or three weeks ago that promptness in paying now will be appreciated by their creditors. We intimate this now, and urge our readers to do as well as they can—it will pay them.

The Hart, Bliven & Mead Mfg. Co. have ready to issue, fully illustrated, the following list of Stationers' Hardware. Nearly all these goods are entirely new designs; they are well finished, and are offered to the trade at prices which ought to make them popular. The following are the discounts: Paper Clips, Weights, Files, Pen Racks, Match Safes and Book Racks, discount 50 and 10 per cent. Twine Boxes, discount 40 and 10 per cent.

PAPER CLIPS.

No. 0, Figured Enameled	Per doz.,	$2·00
No. 00, Bronze Metal	"	5·50
No. 3, Figured Enameled	"	4·00
No. 03, Bronze Metal	"	12·00
No. 1, Figured Enameled	"	2·50
No. 2, Bronze Metal	"	6·50

PAPER WEIGHTS.

No. 45, Figured Enamel'ed, with Iron Knob	Per doz.,	$6·00
No. 50, Fig'd Enameled, with Bronze Metal Knob	"	7·00
No. 050, Bronze Metal, with Bronze Metal Knob	"	12·00

PAPER FILES.

No. 5, Figured Enameled	Per doz.,	$2·50
No. 1, Japanned	"	1·50
No. 1, Gold Bronzed, assorted colors	"	1·65
No. 2, Figured Enameled	"	2·25
No. 3, "	"	1·75
No. 10, Fig'd Enam'd, without Brass Slide	"	2·50
No. 15, Fig'd Enameled, with Brass Slide	"	3·00
No. 010, Bronze Metal, without Brass Slide	"	8·00
No. 015, Bronze Metal, with Brass Slide	"	8·50
No. 20, Figured Enameled, without Brass Slide	"	2·50
No. 25, Fig'd Enameled, with Brass Slide	"	3·00
No. 020, Bronze Metal, without Brass Slide	"	8·00
No. 025, Bronze Metal, with Brass Slide	"	8·50

ENAMELED PEN RACKS.

No. 20, Enameled Pen Racks	Per doz.,	$2·25

ENAMELED TWINE BOXES.

No. 1, Enam'd Twine Boxes, to hang	Per doz.,	$5·50
No. 2, Enameled Twine Boxes, on Stands, packed with Screws	"	6·50

FIGURED ENAMELED MATCH SAFES.

No. 10, Figured Enameled, packed with screws	Per doz.,	$4·50

FIGURED ENAMELED TOILET OR BOOK RACKS.

No. 1, Figured Enameled Toilet or Book Racks	Per doz.,	$12·00

As will be seen by the following circular, the manufacturers of the genuine Emerson Razor Strap have agreed upon a uniform discount. We have altered our former quotation of 40 and 10 per cent. to correspond with the recently established discounts.

The undersigned, manufacturers of the Genuine Emerson's Elastic Razor Strap, have established the following prices and discounts, viz.:

	Per Doz.
17⅛ in. Oval	$15·00
13⅜ in. Oval	7·00
13⅜ in. One Side Flat	6·50
12 in. Oval	6·50
12 in. One Side Flat	6·25
13⅛ in. Barber's Style	6·50
12 in. Barber's Style	6·00

DISCOUNTS.

In 1 Gross lots ..... 25 %
In 5 Gross lots, or more ..... 30 %

TERMS.—Net cash 30 days. Freight on all goods to be paid by purchaser, and all orders subject to market price at time of delivery.

Very respectfully,
CHARLES EMERSON,
BENJ. F. BADGER.

CHARLESTOWN, Mass., Oct. 15, 1873.

Trade in Foreign Hardware continues extremely dull, but holders are firm in their views, and we notice the absence of any effort to force sales. The fact is, leading goods are scarce, and orders to arrive will not overstock the market for some time. Recent advices speak of advances on several unimportant articles of English Hardware, but the market here for all kinds is unchanged.

Nails continue firm at the recent advance, and we continue to quote 10d., in lots under 100 kegs, at $4·75, net. Orders for large lots, for prompt delivery, are easily placed at $4·50, net, for 10d. to 60d. The demand is light, and unsatisfactory for this season, but stocks, at least so far as this market is concerned, do not seem to accumulate, and but few holders at present writing have their assortments complete.

Philadelphia Star and Eagle Carriage and Tire Bolts are quoted this week at 50 @ 50 and 10 per cent. discount. Sales of small lots have been made at discount 50 and 5 per cent., which is the general asking price.

The price of Genuine California Borax has been unsettled of late. Clark, Wilson & Co. have a full supply, which they offer in lots of 100 lbs. at 22 cents per lb., net, but for a large order a slight concession from this figure would be made.

IRON.

American Pig.—The general market for American Iron continues very dull and prices depressed. Two or three large furnaces have blown out, and there is considerable talk among many others of doing likewise, owing to the slow demand for their productions and the high ruling prices of ore. Stocks of all descriptions are steadily accumulating. Prime brands of No. 1 Iron are obtainable at $40, while many others not well known can be obtained for cash considerably lower. We note sales of 300 tons No. 2 extra at $32, cash, which is a fair representation of the market valuation. Gray Forge held at about $28 @ $29, cash.

Scotch Pig.—Holders of Scotch Iron are asking about the same figures as given last week, though it is probable that a cash offer at a reduction would be quickly taken. Notwithstanding the depression here, the Glasgow market still holds its own, and is without any apparent indications of a lower range of prices, unless brought about through a panic there. The stock abroad on October 3 was only 39,000 tons of all brands, as against 137,000 tons at same date last year. The demand here continues very light, and small parcels are selling from yard at $42 @ $43, cash. During the week about 700 or 800 tons Glengarnock have sold from first hands on private terms. We quote: Gartsherrie, which is in very small stock, at $48; Coltness, $45; Summerlee, at $42; Glengarnock, at $41, and Eglinton, at $40.

Following are the prices of Scotch Pig Iron in Glasgow, as reported by Messrs. J. E. SWAN & BROS., under date of Oct. 3:

	No. 1	No. 3	No. 4
Gartsherrie	125/	117/	....
Coltness	127/6	118/	....
Summerlee	120/	114/	115/
Langloan	120/	115/	....
Govan	117/	114/	114/
Calder	*120/	115/	....
Shotts, Bessemer	160/	155/	....
do Ordinary	122/6	115/	....
Carnbroe	117/6	115/	116/
Wishaw	117/	114/	114/
Monkland	117/	114/	....
Chapelhall	120/	....	....
Clyde	117/	114/	114/
Quarter—Clyde	117/	114/	114/

Glasgow Warrants 3-5, No. 1; 2-5, No. 3, g. m. b. 114/.
*f. o. b. Glasgow, 1/ per ton, extra.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock, Ardeer	118/6	116/	....
Eglinton, Lugar, Muirkirk, Portland, Branded Eglinton	117/	115/	116/
Dalmellington	117/	115/	110/

CURRENT RATES OF FREIGHT ON PIG IRON.

To	From Glasgow.	From Ardrossan.
New York	7/6	7/6
Boston	17/	17/
New Orleans	20/	20/
Baltimore	17/	17/6
Philadelphia	16/	16/
Providence	20/	15/

Bar.—The demand for manufactured Iron continues very light, and values weak and depressed.

Old Rails.—There is very little doing in Old Rails, and prices are nominal. Some 300 or 400 tons D. H.'s are reported to have changed hands at Philadelphia at $43. We quote here at about $45 @ $46, though it is doubtful if any could be placed at those figures.

New Rails.—Trade in New Rails is, also, extremely dull. A lot of 2600 tons English, part at New Orleans, are said to have sold on private terms. We quote at about $62, gold, and American at about $70, currency.

Scrap.—Trade in Scrap Iron is just about as dull as in other descriptions of Iron. Lots from yard are obtainable at $40. 50 tons from ship have been sold on private terms.

METALS.

Copper.—The demand for Lake Copper for immediate delivery continues very limited, and sales only effected when forced on the market, and then at very low prices. In Baltimore Copper a fair trade is reported, but, as with Lake, at extremely low figures. The sales for the week embraced about 450,000 lbs. Lake at 24c. @ 24½c., cash, and 450,000 lbs. Baltimore at 21c. @ 21½c., cash. For future delivery very little, if anything, has transpired; dealers are not pressing the market, however, they appearing to feel confidence in the future outlook of the commodity. Manufactured Copper is dull, though prices remain the same as for a considerable period past. We quote at 36c. for New Sheathing, 40c. for Braziers, 45c. for Nails, 20c. @ 21c. for Old Sheathing, 26c. for New Yellow Metal Sheathing, 32c. for Bolts, and 27c. @ 30c. for Nails, Sheathing and Slating. Bolt Copper, 40c.

Tin.—The market for Pig Tin continues in the same dull and unsatisfactory position as noticed for several weeks past. The demand is very light, and while holders find it very difficult to sell for cash, they do not appear disposed to contract for future delivery, especially in cases where unsettled accounts are standing. Advices from abroad continue favorable to the holding interest, the latest cable reporting a slight advance. At London, Straits are quoted at £124. 10; English L. and F., £125; and at Singapore, $33·75 per picul. We hear of a sale here of 100 slabs Straits on private terms. We quote gold prices as follows: Straits, 29¼c. @ 29½c.; English, 27c. @ 27¼c.; and Banca, 33c. @ 33½c. In Plates the trade is also dull and prices depressed, and in some cases lower. We quote: Charcoal Tin, $9·75 @ $10; Coke Tin, $7·25 @ $8; Charcoal Terne, $9·50 @ $9·75; and Coke Terne, $7 @ $7·50.

Lead.—The demand has been very limited for ordinary Pig, and prices are softening. We note sales of 25 tons of domestic at 6½c., gold, and 35 tons selected Stolberg, for White Lead purposes, at 7⅛c., gold, cash. We quote: German and Spanish ordinary at 6⅜c. @ 7c.; English, 7c.; foreign refined, 7¼c. @ 7½c., and domestic, 6⅝c. @ 6½c., all gold. Manufactured Lead is quiet and unchanged. We quote Bar at 9¼c.; Sheet and Pipe at 10½c., and Tin Lined Pipe at 16½c., less the usual discount to the trade.

Spelter and Zinc.—The demand for Spelter is light, and, with a small supply of foreign, the price is sustained. Domestic Plates, however, are a shade easier. Sales, 10 tons Silesian at 10⅝c., gold, and 50 tons Western at 8½c., currency. We quote Silesian at 7½c. @ 7⅝c., gold. Mosselman Sheet Zinc is held by agents at 10c., less 4 per cent., gold, though dealers are selling from store at 9¾c. @ 10c., currency.

Antimony.—There is only a moderate trade doing in Regulus; holders ask 13½c., gold, for time lots, though 8 to 10 casks are reported sold at 13c., gold, cash.

PHILADELPHIA.

MESSRS. BLAKISTON & COX, Iron Merchants, 333 Walnut street, under date of Oct. 21, 1873, report as follows: There are no new features of importance to note in this and near markets. Dullness prevails, and everything seems flat and devoid of interest. In Pig Iron few sales are making, and prices are confused. The larger and older furnace companies are disposed to refuse the low offers that are made them, while the new companies, and some of those whose Iron is comparatively little known, seem eager to sell at ruinously low prices. We know of one of these latter companies offering No. 1 Foundry at $35, delivered. That they can ill afford to sell at this figure is shown by the following table, which we received from one of the oldest furnace companies, owning coal, ore and limestone beds favorably located. Cost of making one ton Pig Iron:

Coal	$9·00
Ore	13·00
Limestone	1·50
Labor	4·00
Office expenses, sundries, &c., at works	3·50
Cost at works	$31·00
Freight to and charges at shipping point (Hoboken)	2·50
Selling expenses, taxes, &c	1·75
Total	$35·25

All the furnaces have reduced wages, some 10, 20 and even 30 per cent. All the large corporations will reduce to the latter basis on Nov. 1. We know of seven stacks in the Lehigh Valley now blowing out, in addition to those already out, several in number. The stock now on hand is large, but the production is being materially reduced. Below we give you the range of prices from about two weeks past up to the present time: No. 1 Foundry, $42 to $35; No. 2 Foundry, $36 to $33; Gray Forge, $33 to $30. These figures include all brands offered in this market. *Scotch Pig* is in light stock, selling in small lots from yard at $47, Eglinton, and $49 for Glengarnock. *Bar Iron* sells at the mill for about 3 6-10, from store 3 8-10 to 3 9-10. *Scrap Iron* is in fair stock, and held at $42 to $40, No. 1 Wrought, in yard. We know of a sale of 150 tons at former price. *Rails*, new American, sell at $69 to $70, at works. Many of the mills have closed, and some now running, in absence of orders, contemplate stopping also.

PITTSBURGH.

PITTSBURGH, Oct. 18.—There has been no improvement in the Pig Iron trade during the past week, and, furthermore, the indications at this writing are not very encouraging. It is possible, of course, that there may be a change for the better within the next week or so, but it is scarcely probable. Some of our most observant and most intelligent operators seem to be impressed with the belief now that trade is destined to rule slow until about the 1st of January, and they base this on the supposition that it will require that period of time for the country to recover fully from the effects of the panic. This has been a hard year on producers thus far, and it looks as if it would go out considerable worse than it came in; since the first of January there has been a shrinkage of from $15 to $20 per ton. It was claimed that nearly all the Pig sold in this market prior to the panic was at a loss of from $2 to $3 per ton to the market; now it can't be sold at all, and the result will be that the furnaces in the Mahoning and Shenango valleys, our main source of supply, will have to shut down; some of them have suspended already. Another bad feature for producers is, that notwithstanding the heavy depreciation in the product, there has been no reduction in the cost of making it; fuel, ore and labor, the three principal items, cost just as much now, if I mistake not, as they did prior to the decline in the product, and they (the producers), as already intimated, will be obliged to suspend operations, however unpleasant it may be. There is so little doing that it is difficult to give quotations. Choice Mill Irons are quotable at $32 to $33, 4 months. A cash buyer could do much better than quoted rates, but they are very rare indeed, and there are but very few buyers on time, as consumers generally seem to have resolved not to carry any more stock for the present than they can possibly help. No. 1 Foundry Iron, $38 to $40; No. 2, $32 to $34; White and Mottled, $29 to $31; Charcoal, $45 to $50 for Warm, and $60 to $65 for Cold Blast. Blooms $90 to $105, according to quality. The market for Finished Irons continues slow, orders have slacked off considerably, and the mills are now nearly all working single turn only; furthermore, if money does not become easier, if the banks refuse to extend accommodations much longer, they (the mills) will be forced to stop, as they will not be able to obtain the necessary funds to meet their running expenses. Prices, although weaker in sympathy with the raw material, are without quotable change. We continue to quote on a basis of 3 and 4-tenths to 3 and 5-tenths for Bars, usual time—an unusually large discount, no doubt, would be made for cash. The Nail trade continues moderately active, although, like everything else, the demand has slacked off somewhat; but the Nail mills, so far as your correspondent can learn, are still in operation, and as stocks are reported small, both in first and second hands, the card, $4·50, is pretty generally adhered to, with the usual reduction of 12½ cents on 100 keg lots and upward, and two per cent. off for cash. The Steel trade is reported as being less active; orders have fallen off considerably, but the mills still have enough old ones on their books to keep them going, and it is not likely that they will lose any time. There have been some few changes made in the card recently, but none of any importance. The demand for Manufactured Copper has fallen off, also, and the mills have barely enough orders to keep them from stopping; business had brightened up just before the panic set in, but since then, as already stated, has gone back. The Glass trade continues quiet, and devoid of anything especially new or important. As noted in my last, Window Glass, in view of light stocks, with no prospect of their being replenished soon, as the factories are all idle, is firmer, and discounts are being reduced; may be quoted at 50 & 10 to 60 per cent. straight. Manufacturers have great difficulty in filling orders of irregular sizes, and they are buying and borrowing from each other.

The *Commercial*, of the 18th inst., says: The condition of the market for Pig Iron is anything but satisfactory. The sales reported cover the business of the last two weeks, and do not indicate any quotable change in prices. The great uncertainty as to the demand for Manufactured Iron makes it impossible to effect sales, unless at a price very much below usual market rates, and but few holders are willing to make the concessions demanded by buyers who have ready cash to pay. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

200 tons gray forge	$32 00—4 m.
100 tons gray neutral	30 00—cash
100 tons gray forge	31 00—4 m.
100 tons mottled	29 00—4 m.
20 tons No. 1 foundry	38 00—4 m.
20 tons No. 2 foundry	35 00—4 m.
20 tons gray forge	34 00—4 m.

ANTHRACITE.

70 tons gray forge	$31 00—4 m.
65 tons white cold short	29 00—4 m.
50 tons gray forge	31 50—4 m.
25 tons No. 1 foundry	39 00—4 m.
20 tons No. 2 foundry	35 00—4 m.
10 tons No. 1 foundry, extra	40 00—4 m.
10 tons gray forge	30 00—4 m.

CHARCOAL.

130 tons No. 1 foundry	p. t.
20 tons No. 1 foundry	$48 00—4 m.
20 tons No. 2 foundry	44 00—4 m.
10 tons No. 1 foundry, extra	51 00—4 m.
10 tons No. 1 foundry, extra	52 00—4 m.

CONNELLSVILLE COKE.

50 tons No. 1 forge	$33 00—4 m.

BALTIMORE.

MESSRS. WYETH & BROTHER, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices under date of Oct. 21, 1873: All here in the Iron line is excessively quiet. Quotation figures for Best Bars are weak and undersold, and for this reason nominal in character. Remainder of list firm and unchanged.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ¾ to 1 thick	3¾c. to 4c. per lb.
1 to 4½ wide by 1½ to 2 thick	
Round and square, ordinary sizes, from ¾ to 2 inclusive	3½c. to 4c. "
Hoop Iron, 1½ wide and upward	5¼ to 5½c. per lb.
Band Iron, from 1¼ to 4 in. wide	4½ to 4¾c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick	5 to 5¼c. "
Norway Nail Rods	8¼ to 8½c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16½c. "
Machinery Steel	11½c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	13c. "
Perkins' Horse Shoes, per keg of 100 lbs	$6·37½
" Mule Shoes " "	7·37½

Common Horse Nails, from 14c. to 18c per pound.

10	9	8	7	6

Putnam Horse Nails, 23 24 25 26 28c. per lb.
R. R. Spikes, 5¼ by 9-16 at 4¾c. to 5c. per lb.

BOSTON.

BOSTON, Sept. 18.—The demand for Refined Bar Iron is light, purchasers doing nothing more than to supply present wants. Prices are steady, being so low that any concessions would leave the dealer no profit, the price now barely paying for handling the goods. Pig Iron is quiet, and Scotch is easier, with no large sales. We quote yard lots of American Pig Iron at $40 to $48 per ton, including No. 2 extra at $40 to $42, and No. 1 at $46 to $48. We quote Eglinton at $48·50 to $49·50, Coltness at $56, Glengarnock at $48·50 to $50, Charcoal at $60 to $70.—*Com. Bulletin.*

LOUISVILLE.

Mr. GEO. H. HULL, under date of Oct. 20, writes us as follows: Market dull and lower, sales being confined to small lots for immediate use. A considerable concession is made on cash sales. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$47·00 @ 48·00
" 2 " " " "	42·00 @ 44·00
" 1 Forge, " " "	34·00 @35·00
" 1 F'dry, from Tennessee Ores	46·00 @ 47·00
" 2 " " "	41·00 @ 43·00
" 1 Forge, " "	34·00 @ 35·00
" 1 F'dry, from Alabama Ores	46·00 @ 47·00
" 1 " " Iron Mountain Ores	48·00 @ 50·00

HOT BLAST STONE COAL.

No. 1 F'dry, from Missouri Ores	44·00 @ 45·00
" 2 " " "	40·00 @ 42·00
" 1 Forge, " " "	33·00 @ 34·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	60·00 @ 62·00
" " Tennessee Ores	58·00 @ 60·00
" " Alabama Ores	60·00 @ 62·00
" " Georgia Ores	60·00 @ 62·00
" " Missouri Ores	58·00 @ 60·00
" " Kentucky	56·00 @ 62·00

CINCINNATI.

MESSRS. ADDY, HULL & CO., under date of Oct. 20, write us as follows: The market continues extremely dull, with very light sales, the demand being confined to immediate wants of consumers. Quotations must be regarded as nominal, and would not be adhered to could round lots be placed.

HOT BLAST CHARCOAL.

Hanging Rock	No. 1 @ 48·00—4 mos.
" "	No. 2 @ 45·00—4 mos.
" "	Forge @ 36·00—4 mos.
Tennessee	No. 1 @ 46·00—4 mos.
"	Forge @ 36·00—4 mos.
Alabama	No. 1 @ 50·00—4 mos.
Missouri	No. 1 @ 56·00—4 mos.
"	No. 2 @ 45·00—4 mos.

HOT BLAST STONE COAL.

Missouri	No. 1 @ 47·00—4 mos.
"	Forge @ —4 mos.
Ohio	No. 1 @ 44·00—4 mos.
"	Forge @ 35·00—4 mos.
Scotch Pig,	No. 1

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	@ 65·00—4 mos.
Missouri	@ 62·00—4 mos.
Kentucky	@ 60·00—4 mos.
Tennessee	@ 60·00—4 mos.
Georgia	@ 63·00—4 mos.
Alabama	@ 63·00—4 mos.
Machinery and Forge	@ 60·00—4 mos.
Blooms	@ 115·00—4 mos

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending October 21, 1873:

Hardware.

Boker Hermann & Co.
Mdse. pkgs., 17
Casks, 3
Beam & Murray,
Cases, 2
Curley J. & Bro.
Cutlery, cks., 1
Dodsworth T.
Cases, 3
Duden, Freres & Co.
Cases, 3
Field A & Co.
Cutlery, cs., 7
Chains, cks., 26
Cases, 4
Casks, 2
Friedmann & Lauterjung
Mdse. pkgs., 14
Gueutal Geo.
Cutlery, cks., 3
Hilger E. & Sons,
Mdse. pkgs., 4
Harmar Wm. & Co.
Packages, 4
Lau & Garlichs,
Mdse. pkgs., 5
Laughland & Co.
Wire, pkgs., 38
Moulson John,
Packages, 5
Merchants Dispatch Co.
Cases, 4
Moore's J. P. Sons,
Arms, cs., 14
Peace Chas., Jr.,
Packages, 8
Patterson Bros.
Cases, 1
Casks, 3
Rosenfeld Bros. & Co.
Cases, 3
Schoverling & Daly,
Mdse. pkgs., 1
Cases, 3
Suvers J. A.
Cases, 1
Turnor R. A.
Cases, 3
Tomes, Melvain & Co.
Cases, 1
Vom Cleff Bros.
Mdse. pkgs., 8
Van Wart & McCoy,
Mdse. pkgs., 1
Western Union Tel. Co.
Gal. wire, lots, 812
Wietnisch F.
Mdse. pkgs, 6
Witte John G. & Bro.
Mdse. pkgs., 3
Order.
Files, cks., 4
Arms, cs., 8
Cases, 6

Iron.

Crocker Bros.
Pig, tons, 120
Congreve Chas. & Son,
Rails, 1093
Cotton & Haley,
Scrap, tons, 80
Henderson Bros.
Pig, tons, 450
Leigh R. & Co.
Scrap, bags, 76
Laughland & Co.
Haybands, bdls., 825
Order.
Pig, tons, 160
Old rails, 3134
Rods, bdls., 294
Fish plates, bdls, 760
Cases, 40
Cotton ties, bdls, 2000
Bars, 3131
Gas pipes, bdls., 9

Steel.

Brown Wm.
Bundles, 37
Cases, 11
Cockayne J. W.
Bundles, 147
Bars, 83
Cases, 5
Frith Edward,
Mdse. pkgs., 3
Hogan John,
Cases, 36
Jackson Wm. & Co.
Cases, 3
Lang W. Bailey & Co.
Tire blanks, 28
Naylor & Co.
Cases, 36
Bundles, 7
Axles, 24
Prosser Thos. & Son,
Tire forgings, 121
Pieces, 30
Van Wart & McCoy
Bundles, 200
Order.
Rails, 3428
Cases, 3
Bundles, 369
Casks, 1

Metals.

Bradbury Geo. H.
Scrap, bdls., 230
Bruce & Cook,
Tin plates, bxs., 119
Cotton & Haley,
Copper, pkgs., 12; pcs., 25
Brass, pkgs., 29
Lead, pkgs., 53; pcs., 27
Grund & Cerero,
Lead, pigs, 2475
Lamarche H.
Zinc, bbls., 130
Phelps, Dodge & Co.
Mdse. pkgs., 249
Tin plates, bxs., 5311
Order.
Zinc, bbls., 35
Lead, pcs., 820; pigs, 792
Tin plates, bxs., 1729
Tin, ingots, 271; bbls, 15

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of Oct. 4, 1873, report:

Metals.—The course of the money market, and other untoward events, are exercising a depressing effect on one or two branches of Metals, but the trade generally being healthy, there is not any great anxiety felt as to the result; and the inherent soundness of the business is fully exemplified in its successfully overcoming these unexpected attacks. As we anticipated, Scotch Pig Iron Warrants have recovered from their late fall, and transactions are numerous. The shipments for the past week amounted to 12,073 tons, against 13,707 tons in the corresponding week of 1872, and are approximating more closely to those of last year than they have done for some months past. There is a little more disposition to sell shown by some of the Middlesborough smelters, and slight concessions have been made to secure orders. The near approach of Birmingham quarter day, and the present uncertainty how the labor question in Staffordshire is to be arranged, have almost stopped trade in manufactured Iron, but it is hoped this will prove temporary, and if an amicable settlement can be come to by masters and men, a fair average fall trade will be the probable result. There has been a decline in the value of Copper consequent upon the report of excessive charters from the West Coast during the month of August. English also is dull. The recent sale of Banca Tin in Holland, and a telegram from Batavia just to hand advising that the sale of Billiton had gone at 79·66, equal to 124/, have unfavorably affected our market, and Straits and Eng'ish are both lower. Lead maintains its position, and smelters are firm at present rates. Spelter is quiet.

Iron—"Ayresome" Yorkshire Pig Iron, No. 1, 107/6; No. 2, 102/6; No. 3, 100/; No. 4 (Foundry), 98/6; No. 4 (Forge), 97/6 net cash, or 2/ extra 4 months' bills. Scotch Pig warrants, 113/ to 115/. Staffordshire Bars, £12. 10/ to £14. Hoop Iron, £13. 10/ to £14. Gas Tubes, 47½ per cent. off new list. Boiler Tubes, 17½ per cent. discount.

Copper.—English Tough Ingot, nominally, £91 to £93. Chili Bars, £82 to £83.

Tin—English Ingot, nominal, £126 to £128. Straits, £123 to £124.

Tin Plates.—Best Coke, I. C., 32/ to 35/; Charcoal, I. C., 36/ to 40/ per box.

Lead.—Best English Soft Pig, £23. 15/ to £24. Refined Red Lead, £25 to £27.

Antimony.—French Star, £59 to £60.

Spelter.—Silesian, Special Brands, £27 to £27. 10/. English, Best Brands, £27. 10/ to £28.

FRANCE.

(Moniteur des Interets Materiels.)

Paris, October 5, 1873.—*Metals.*—Everything seems to conspire against the metal markets. The New York panic, so close upon the heels of the Vienna crisis, the discount raising at London, a short grain crop in Europe, the continuation of civil war in Spain, the uncertainties which surround politics in France, the decline everywhere in Chinese and India produce, the Ashantee war, which may bring about additional taxes in England, everything, in fact, seems calculated to cause serious uneasiness and to weigh heavily on dealings and prices. As regards *Copper* in particular, the remarkable weakness it has of late been exhibiting is more particularly due, it would seem, to the large shipments made on the coast of Chili, which, since the beginning of August, have summed up some 5000 tons. Speculators have been very much misled on this very point, for they had based their operations on suppositions of precisely a contrary nature. A panic seems to be impending among them, and the sooner it does come and rids those weak holders of what they have on hand, the better it will be for the future of Copper markets in general, which have had this cloud of weak holders overhanging them for some time past. In October and November large quantities will come up for delivery to these weak parties, and it will be difficult to determine to what figure Copper may be depressed in the event of fresh financial difficulties arising in some quarter. The late Dutch Tin sale has had an unfavorable look about it, and has started a fresh decline in this metal, which seems to have lost bottom altogether. *Lead* shows no signs of wavering, but, on the contrary, leaps up everywhere to a remarkable degree of firmness. *Spelter* is not quite as well sustained. The manufacturers of Tin Plates are indulging in a most ruinous competition among each other, and are running down prices in a fearful manner. *Copper* quotations in France: Chili bars at Havre, 225 francs; at Paris, ingots, 237½; at Marseilles, Chili ingots, 228; in Germany, at Cologne, nominal; at Berlin, Chili refined, 30¾ to 31¾ thalers; at Stettin, 31 to 32; in Holland, Drontheim, 50 to 57 guilders. *Tin* quotations: Banca, at Paris, Havre delivery, 340 francs; at Marseilles, 345; at Berlin, 45 to 45¼ thalers; at Stettin, 47. *Lead* quotations: Spanish, at Paris, 60 francs; at Havre, 57 to 58; at Marseilles, 59½ to 60; at Berlin, Tarnowitz, 8 to 8¼ thalers; Freiberg, 8 to 8½; Clausthal, 8 to 8¾; and Spanish, 8¾ to 9¼; at Stettin, 8 to 8½; Amsterdam, Soft Lead, 13¼ to 13¾ guilders; Rotterdam, Spanish, 13¾; and at St. Petersburg, 29 roubles the 164 kilos. *Spelter* quotations at Paris, deliverable at Havre, Silesian, 72 francs; at Berlin, 9 to 9¼ thalers; at Breslau, 8¼ to 9; and at Stettin, 9¼; at Amsterdam, 13 to 13¼ guilders. *Tin Plates* at Rotterdam down to 18 to 20 guilders per box. *Iron*—The Iron situation is still in a languishing condition, and no large transactions can be expatiated upon as showing some revival in some quarter on a more extensive scale. Only the retail trade, supplying immediate consumption, seems to keep tolerably alive the manufacturing interests of France, spreading a moderate amount of activity, and keeping them from stopping work outright, although they realize profits on what they deliver to commerce. Should no general revival take place within the next six weeks, the winter campaign will prove one of the most gloomy we shall have seen for many a year. Prices are more nominal than anything else, and show no perceptible change. At a recent submission of tenders in this city for the furnishing of Galvanized Iron Wire, the Chatillon Co. offered the lowest—say, at 602·97 for four millimeters, and 620·09 for three millimeters, which was 200 francs below the highest price submitted, showing a remarkable irregularity of values, characteristic of the present condition in which iron matters are placed in France. *Coal.*—Paris keeps up steadily late rates, most of our producers still showing much stiffness, now that the winter campaign has opened. The dealings are manifold, and the market is lively. We should add, however, that if on the one hand this sudden revival has exhausted the lately accumulated stocks, especially at Mons and Charlerol, they will now replenish as quickly, the bulk of the winter supply having been laid in. This will apply equally as much to the North and the Pas de Calais, identically situated. A great deal has been ordered in England, whither orders continue to be forwarded, but all of a sudden it is found out that there are not vessels and steamers enough for the transportation of these large quantities of Coal. For the spring campaign this latter difficulty is not likely to occur, and we expect no dearth of Coal, either domestic or foreign, for the opening season of 1874.

BELGIUM.

(Cote Libre.)

Liege, Sept. 27, 1873.—While Coal persists in maintaining its exorbitant rates, Cokes are offering at declining rates, and some manufacturers have begun to extinguish their fires partially or altogether. The Iron market is in a very uncertain position. Large quantities of Pig Iron are offering by some works even at losing figures, but the majority of producers and speculators count upon a speedy favorable reaction. Wrought and Sheet Iron are in but light request.

Charleroi, Sept. 27, 1873.—The decline in Pig Iron has afforded our rolling mills at least some margin. There is a good deal of Rod Iron selling at 25 to 26 for No. 1, but some works firmly cling to 27 francs as a basis for their price lists, but this cannot be looked upon as a quotation that could possibly lead to sales. Some orders, it is true, still drop in, but they are barely sufficient to keep the Rod Iron and wrought goods works going. Pig Iron has become irregular and weak from the precipitate manner in which it has been pressed for sale. The Coal market is unshaken in its firm attitude, and in some descriptions even higher.

Liege, Oct. 4, 1873.—*Coal* prices remarkably firm and rising. *Iron* and *Metals* in general without any noteworthy change.

Charleroi, Oct. 5, 1873.—*Iron*, quiet and apparently remote from any amelioration. Wrought Iron, No. 1, according to brand, 25 to 26 francs, with purchasers at this. Iron stores accumulate stocks but slowly, and touch nothing but what is immediately requisite. *Pig Iron*, in light stock, and at 15 francs some sales have been effected. *Coal* as firm as ever.

Moniteur des Interets Materiels.

Brussels, Oct. 5, 1873.—*Coal.*—The opening of the winter campaign has rendered firmer, if not the hopes, at least the pretensions of producers. Prices of all descriptions are sustained, but not better, and Coke is weaker than ever. Mons and Charleroi are supreme and feel elated, while Liege feels less confident. At the Conchant de Mons the stocks are light and prices firm at 40 francs. At Liege, the persistency with which Coke has of late declined casts a light shadow over the otherwise bright picture. A wholesale lesson is thus given to those who, contrary to all reason, indefinitely multiplied the erection of Coke furnaces. A good many from among them are now compelled to extinguish fires. During the first 7 months Belgium has imported 346,000 tons coal, 135,000 of which from Germany, 73,000 from England, 69,000 from France, and the remainder from Holland. Last year, during the corresponding period, we imported altogether but 110,000 tons. Our export has been the following: In 1873, during the first 7 months, 2,497,000 tons, against 2,658,000 in 1872. Coke export this year 527,000 tons, against 449,600 last year.

(Le Commerce.)

Brussels, Oct. 8, 1873.—*Iron.*—The general quiet, or rather stagnation, continues in its listlessness without the slightest interruption, contrary to the expectations of most of our producers, who had been looking forward to an amelioration with a certain degree of confidence. Acoz has extinguished one furnace, and now Hourpes adds another suspension of work. Pig Iron is at 105 to 110, leaving no profit, and Wrought Iron at 250 to 260. Iron Beams are at 275 to 290 francs. Special Iron manufactures are the only ones that keep up prices. All are anxious to receive orders, and foreign purchasers can now operate in our country most advantageously. There has been a falling off in Iron manufactures exported of 5,000,000 francs during the past 7 months.

HOLLAND.

(Koch & Vlierboom.)

Rotterdam, Oct. 7, 1873.—*Tin*—Spot Banca has been done at 74⅛ to 72⅛ guilders, deliverable from the November sale at 73 to 71 and 71½, and from the February sale, 1874, at 71, 72 and 71½.

GERMANY.

(Frankfort Zeitung.)

Frankfort, Oct. 3, 1873.—At a meeting of shareholders of the Bochum Steel Manufacturers' Union, the annual statement submitted by the Board of Directors showed a net profit of 700,000 thalers, and after providing for the reserve fund of the company, a dividend of 17 per cent. was declared. The amount of manufactures sold sums up 7,000,000 thalers. An increase of capital, to the extent of 1,000,000 thalers, has been resolved upon for various purposes, to be issued at the rate of 150 thalers the share of 100 thalers, 50 payable Dec. 1, next, and 100 on July 1, 1874. At the Marianna mines of the company a new shaft is being sunk, calculated to yield between 10,000 and 20,000 bushels daily.

(Borsenhalle.)

Hamburg, October 3, 1873.—*Metals.*—*Lead* is sustained in value, German at 25 to 26; English, 26·30; there is no Spanish. *Copper* is weak; Northern sorts, 96 to 105; Chili, 126. *Tin.*—Feebly upheld; Banca at 1·48; English, 1·38 to 1·40, and Rods, 1·42½. *Spelter.*—Without dealings and with a weakening tendency; we quote the same 27½ to 27¾ marks.

EAST INDIES.

(Aikens, Spence & Co.)

Colombo, Sept. 6, 1873.—*Plumbago* remains about the same as last advised, and we are still without any opportunity for shipping to the United States, no suitable vessel having been obtainable in the interval. There are about 350 to 400 tons Lead ready for shipment to New York, but, unless a vessel is soon available, a good portion of the above mentioned quantity may possibly be sent forward to London instead. Shipments to London are being made to as large an extent as the available tonnage will admit of, and there is keen competition for room in every vessel loading for London, for which freights on this article are very firm at 60/ per ton. The shipments of Plumbago to the United States since October 1, 1872, figure up the large quantity of 100,741 cwts., against 43,798 the preceding season. This season's shipments to other countries from Colombo and Galle, 64,107 cwts., of which 63,055 to the United Kingdom. We quote lump, 460/ to 493/6 per ton, free on board with commission, exchange at par, with no demand for the United States; freight, 75/ per ton; chip, 220/ to 243/; and dust, 110/ to 126/.

(Boustead & Co.)

Singapore, Aug. 23, 1873.—*Tin.*—Early in the fortnight there was a fair demand for the United States at $34·50 to $34·55, 630 piculs taken, and for China, about 730 piculs "Fonghing" chop were bought at $34½. At the close there is very little demand for the article, and dealers are offering to sell at $34¼; no buyers over $34. *Exchange*—4/4 to 4/4¼. For New York the Evening Star cleared on the 13th inst., and the berth is now unoccupied. *P. S.*, Sept. 25, telegraphic. *Tin*—$34¼. *Exchange*—4/3¾.

SOUTH AMERICA.

(H. Fischer & Co.)

Valparaiso, Sept. 16, 1873.—*Copper.*—The offerings being light, holders have been able to maintain the figure of $17⅛ on shore here, for small lots, but since duller accounts have been received from England, purchasers have lowered their offers to $17⅛. There has been some more inquiry for lots on the coast, with secured steam freight, and 70 tons have thus been sold on board at Coquimbo, at $18·05, combined with a 55/ freight; 100 tons on board at Lota at $18, with 60/, and 225 tons on board at Guayacan at $18, with 60/ freight. In Regulus and Ores no business has been done for export. The sales of Bars have summed up 9107 quintals, at $17⅝ to $18. To-day's closing quotations are the following: Bars, $17⅜ to $17⅝, at Guayacan and Lota, with 60/ per steam, $18, on board; Regulus, 50 per cent., $7·20 to $7¼, and Ore, 25 per cent., $2·75 to $2·97. The extraordinary scarcity of vessels on this coast has brought about a steady improvement in freights. Coal sales, 1148 tons; Swansea smelting and Cardiff steam at $13½ to $14, deliverable here and at Caldera. Exchange, 60 days, 44¾ to 44¾d., and 90 days, 44½ to 44¾d. to the dollar.

(Sandbach, Parker & Co.)

Demarara, Oct. 7, 1873.—*Iron Hoops* are steady at £4½ the 100 pounds (duty 10 cents the 112 pounds). Import of Iron Hoops to date, 5685 cwts., against 8920 in all 1872. Import of *Coal* to date in 1873, 41,022 tons, against 57,298 in all 1872; hogsheads ditto, 12,157 thus far in 1873, against 22,718 in 1872. Coal commands $10 to $10½ per ton, ex ship, and from store, $13 per hogshead. *Exchange*—90 days' London, $4·80 the £ sterling.

Correction.—In the letter of our Pittsburgh correspondent, published in our last issue, a statement appeared to the effect that Mr. Springer Harbaugh, of the firm of Harbaugh, Mathias & Owens, proprietors of the Superior Rail Mills, had suspended. We have since received information that this report has no foundation in fact, and that it originated in the unintentional misconstruction of a paragraph which appeared in one of the Pittsburgh papers announcing the temporary stoppage of the Superior Mill. We are assured that neither Mr. Harbaugh, nor the firm of which he is a member, have suspended payments or have any liabilities which they cannot meet. The mills were stopped not for want of orders, but because the firm would not dispose of rails except for cash, which terms buyers were unable to accept.

PHILADELPHIA CORRESPONDENCE.

Philadelphia, Oct. 20, 1873.

The week under notice has shown no special improvement in the difficulties under which our manufacturers labor, and the disposition on all sides appears to be to curtail expenses in every possible way. Indeed, firms which are perfectly solvent have to prepare themselves not only to meet their obligations, but also to withstand the effects of rumors of their failure, which are street talk from day to day. What would we think in ordinary times of the following, which was an actual occurrence to-day, and is *verbatim:*

Messrs. —— ——: Gentlemen—We hear that your paper is being protested, and that a gold draft for $200,000 of yours came back this morning. Have contradicted the report and pronounced you solvent. Are we correct?

Yrs, &c., —— ——.

The answer is equally sensational, if paradoxical, viz.: "Perfectly correct. Much obliged." But few not in the squeeze realize the suffering and vexation such idle rumors cause those in regard to whom they are circulated. If one were to quote the street, every iron man of prominence in the trade would have been hopelessly bankrupt, and every mill and furnace in the sheriff's hands. That the production is kept up as it is has been more from the pluck of the manufacturers, and the certainty that their mills would depreciate more rapidly while idle than in use, since it is patent that at present figures at which sales are made, *not at which they are quoted*, the price received does not nearly cover cost of manufacture. Still, there is as clearly, also, a disposition to magnify the evil and look forward to too black a future. Those who—and they are not few—think that the trade for the next five years will be little better than the present are decidedly too blue, and a moment's consideration will prove it. The present shrinkage in values brings down ores, coal, labor, as well as prices of product, and these once down will not soon rise. This very reduction strengthens us against foreign competition. When we get ores and expenses to such a figure, and this winter will do it, that pig metal can be made at not more than $20 and sold at $25, and bars can be sold at $65, no danger from foreign importation need be feared—and then what? Evidently, that the production of our country must supply the amount previously imported, which was equal in 1872 to, say, 1,200,000 tons of all kinds. Yet even this amount is necessary for the maintenance of our finished railroads, without counting on any new work. The truth is, that the requirements of a country like this are such that the iron trade cannot possibly be depreciated unless—and which is impossible—the prices of raw material and labor abroad decline fully one-fourth. Hence, it is fair to presume that 1874, or a portion of that year, will see a more healthy and legitimate trade, and also more satisfactory to the producer, than has ruled during the season of inflation and speculative prices.

ROLLING MILL ITEMS.

The mills of the eastern portion of the State are running light, but the Lehigh Valley mills are all yet reported busy. The Phœnix Iron Co.'s works are running full time still, and the Bridge Company has just had an order for a new bridge to replace the old chain bridge above Washington, D. C., which will be well remembered by those who went soldiering during the late war. The new mill at Phœnixville is progressing, and will be the largest in the world. No report has been made of any delay in the Bethlehem Works, the Bessemer department of which went into successful operation early in the month. Some of the weak-kneed naturally go to the wall, and the property of the Hamburg Iron Co., in Berks county, is advertised to be sold by the sheriff on the 25th inst. This includes the rolling mill and dwelling houses, with eight acres of land, and is a good property—if any iron plant is good property now. The Glasgow mill, near Pottstown, Pa., is being repaired by Messrs. Bailey & Shoemaker, and will include a puddle mill with four furnaces, waterpower, and a new bar and plate mill, later. The Philadelphia mills are all running short time or filling old orders, but the nail works out of town report a good demand for nails, and will probably continue busy, production in this line having been kept down during the summer. The plate mills are also better off than was supposed, bar and rail mills feeling the stringency worst, but even those could have work if confidence could be restored. A prominent rail manufacturer of the western portion of the State stated to me during the week that at no time since the panic had they been without inquiry for rails, but that as they could not sell for cash, and dare not take paper at four months, they preferred shutting down their mill.

THE CHESTER SHIP YARDS.

From this growing center of iron consumption it is encouraging to learn that the builders of both iron and wooden ships are busy and unaffected by the crisis. All or most of the yards have a year's work on hand, and no reduction in wages or in cash payments have yet been made, nor is likely to be. Orders for new ship work are coming in, predicated on next year's prices of metal, and probably 1874 will show a greatly increased construction of iron tonnage on the Delaware.

RESUMPTION OF WORK AND SPECIE PAYMENTS.

A portion of the men on strike at the Southwark Iron Works have resumed work, a compromise having been effected, by which wages are only reduced ten per cent., instead of twenty, and full price to be paid when the panic is over, that indefinite time which every one is looking for. The hands of Messrs. Wood, Dialogue & Wood, iron and wooden shipbuilders, Camden, had a foretaste of the financial millenium this week by receiving their wages in gold and silver coin, without any deduction for premium. This was a decided sensation, and it required considerable calculation among the storekeepers in footing up weekly bills.

LOCOMOTIVE EXPORTS.

To show that their firm had not suspended, and that trade had not departed from us, the Baldwin Locomotive Works shipped on Tuesday last, per bark Alice Tainter, ten locomotives complete to Rio Janeiro, Brazil. These engines are to supply the Don Pedro II. Railway, and were valued at $205,000, a neat little gold remittance for the firm. The number of men discharged from this works since Sept. 27th has been 674, 214 of whom were from the smith shop, and 101 from the foundry. As 1976 still remain, however, it will be seen that the works is not short-handed.

MEETING OF THE FRANKLIN INSTITUTE.

The October meeting of this body, held during the week, was especially interesting. The proceedings included the minority report of the committee on horse-power. A very interesting paper on a new brake was read by Mr. Henderson. The secretary's report on the Vienna Exposition stated that the display of American tools, both machine and hand, showed their superiority, and congratulated the members of the Institute that so many of them had borne off prizes. The first coal cutting machine in use in the United States was described, and the mechanical exhibition for the month included an apparatus for regulating water and gas supplies to avoid overflow, bursting, freezing and clogging. Also a new gas burner and a very complete new friction journal. A model for an apparatus for lowering boats in a seaway, and for elevating building material, was shown by Mr. Hart and excited much interest. The time-honored Institute is especially wide awake just now, and in the hands of the live men who control it only requires a little effort to give us a renewal of the exhibitions for which this city was once famous.

THE NATIONAL BROTHERHOOD OF LOCOMOTIVE ENGINEERS.

This body has been in session here during the week, and certainly, if one would seek for the intelligent representative American mechanic, they would have been found right here. Such a wide awake, alert set of men seldom congregate anywhere. And as specimens of physical manhood they would have delighted Frederick the Great. Equally prompt in their business matters also they appear. This was the Tenth Annual Convention of the Brotherhood, which is partly beneficial, and combines a trade union, in its most peaceful form, with a beneficial society, an accident insurance company, and a hospital fund, publishes a newspaper, and has 9500 members, divided into 172 sub-divisions, cash receipts of $22,000 per annum, and a reserve fund of $32,000 more, and which expended $23,000 among its members this year. Such an association can afford to hold up its head amongst the "bosses" without shame, and the wisdom of its presiding officer, as shown in his address, proves that the members are no whit behind their employers in common sense or business ability. This address of the president, G. C. E. Wilson, deserves more than a notice; it was well written and delivered, able, concise, moderate in tone, moral in principle and energetic in action. It is not an overstatement to say that it is very doubtful if any railway president in the country could have delivered a better one, and I have yet to hear anything at all equal to it from the presiding officer of any manufacturing association.

Reviewing the flattering condition of the brotherhood, Mr. Wilson stated the financial facts above given, and added that their *Journal* paid a net income of $6000 yearly (how many other journals wish they did as well). Referring to the strike in Missouri last summer, the remarks of Mr. Wilson were very moderate, and are worthy of being quoted as an example to trade unions generally. On this subject he said:

As I understand the principles of the brotherhood, they are intended to protect the members in their rights so far as they can by the use of moral influences. If we fail in obtaining justice by mild measures, we must be content to wait until prejudices can be removed.

We have never undertaken to say what kind of men railroad companies shall employ. If the members of our organization cannot compete successfully with non-members, then I cannot see any reason why they should have the preference. We claim to use our utmost efforts to improve the ability and character of our members. We also claim to watch over the conduct of our members, and thereby make them more efficient, and in case they prove unreliable and unsafe, we report them to the officers of the road. In short, we are trying to win the confidence and esteem of all good men, and feel confident of ultimate success; but we cannot reasonably expect to attain all we seek to accomplish without some opposition. All our past history proves that the best way to overcome prejudice and opposition to our organization is by showing in the daily life and work of our members the claims they and their organizations have to recognition.

Sobriety is one of the strongest requisites for success to the locomotive engineer, and the G. C. E. urged in eloquent language the necessity of a provision in their constitution prohibiting the use of liquor by members when on duty. Sunday running of freight trains was alluded to, and the statement made that managers were willing to adopt a system of handling and moving freights which would do away with Sunday work, and advising co-operation with the companies on this point. The address was a model one in every respect, and the brotherhood, if as wisely conducted as at present, cannot fail to command the respect of both railroad managers and the traveling public.

THE STEAMSHIP INDIANA.

The last new ship, being the third of the American line of steamers, sailed for Queenstown and Liverpool on her first trip, on the 16th inst., with a fair complement of passengers and a full freight. The Indiana is said to be superior to the other ships in fitting, and expected to be the fastest of the line; the Ohio having already shown herself faster than average steamers, while the Pennsylvania is improving rapidly in speed, making her last passage to Queenstown in ten days from this city.

THE CENTENNIAL PLANS.

The Centennial Commission has concluded the examination of plans for the building, and will make their decision speedily, so that I will probably be able to give it to your readers in my next. The plan of Mr. Schwarzman, for the adornment of the grounds, has been adopted, and great interest is felt in that for the buildings, and the programme of celebration.

The gossip in both business and general circles for the week is fairly embodied above, and although the names of several temporarily embarrassed firms might have been given, it is best to avoid individual mention in these days of suspensions, and thus give all a chance to recover mutual confidence, now the great necessity of the hour.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

Sheffield, Eng., October 7, 1873.

The quarter days are past, and we are now close upon the quarterly meetings at Birmingham, Wolverhampton, Middlesboro', and elsewhere. Whether the iron masters will endeavor to uphold or even put up present prices, or whether they will make a bold attempt to force down quotations yet remains to be seen, and I do not need to dwell upon the fact that their decision is very anxiously looked forward to. One thing, however, is quite certain, and that is that prices are at present very stiff, and show no sign of relenting. The question of the revision of iron workers' wages, yet pending, unsettles trade somewhat, but in the face of this it is reported that in South Staffordshire some considerable specifications are being placed, and not only so, but they are being both refused and reduced in bulk, on the ground that they can only be accepted at prices ruling after quarter day. The Birmingham *Post* gives an instance of this, and says: "In one instance, where the order was accompanied by a cheque, with a view to ensure prompt execution, the cheque was returned with an intimation that the order must await its turn; and in another case a specification for 1000 tons of tube strip was cut down by the contracting firm to 200, as the maximum quantity they could undertake to deliver at current prices. Such facts are significant of the alteration which has taken place in the condition of the trade since the early part of August, when the mills and forges throughout the district were running, on the average, not more than three days a week." Second class firms appear to be experiencing a greater improvement than even the leading firms, and their quotations are nearer the list than for a long time past. Bars of these makers quoted a fortnight back at £12, are now not to be had at less than £12. 15/ or £13, and good second class bars fetch fully £13. 5/. Earl Dudley's brands are still £14. 12/6, and other marked descriptions £14, with an upward tendency. Sheets are also firmer in the Wolverhampton district, singles being £15. 2/6, and Messrs. Baldwin's, £19. 5/. Hoops are some 2/6 per ton dearer. The trade thereabouts has been "kinder encouraged" by a statement recently made to the effect that within the last week a Staffordshire house has contracted to supply 400 tons of light section rails to Montreal, with the probability of being called upon to repeat the order—showing, say the local papers, "that we can still compete with and beat the American iron manufacturers." I may, *en passant*, say that it is quite believed that you will not yet compete with us to a serious extent, but that recent statements have put the British iron masters on their mettle (metal if you will), and they are circumventing the whole globe for anything of a ferruginous nature. For instance, the letter of a Wolverhampton correspondent, who is generally well informed, says: "A number of iron masters in the Staffordshire district have just acquired nearly 20 square miles of property in the Wharekawa district, in the province of Auckland, New Zealand. The property embraces 8700 acres of coal and ironstone. The chief seam of coal is found in some parts within a few yards of the surface as thick as 20 feet; and it is computed to be capable of yielding an average thickness of 10 feet throughout the whole 8700 acres. This represents no less than 126 millions of good coal. The ironstone is of the brown hematite class, and contains as high a percentage as 62 of fine iron, and is believed to yield an average of 50 per cent. Four specimens reported upon on Thursday, after analysis by a metallurgical chemist in the Midlands, showed 60, 59, 50½, and 36 per cent. respectively. Calcined it will be worth in this country 30/ per ton. It can be brought across from the Frith of Thames at about 5/6 per ton, and if by and bye it should have to be sold at much less per ton than the prices now current, quite half a guinea per ton profit may be looked for. Made into iron upon the estate, the coal and ironstone estimated each at 8/ per ton, and the limestone also found on the estate, at 7/, would enable a ton of hot blast pigs to be produced at £2. 13/ per ton, and the quality would be equal to British iron, which is now selling at £7. Made into cold blast iron the cost would be about £2. 17/6, and the quality would be equal to the British iron which now realizes £8 per ton. It does not yet appear what these iron masters intend to do with their minerals—whether they are about to import and use them at home, import and sell them at home, or partly both; whether they are going to import the ironstone and sell the coal in New Zealand, or whether they are about to erect furnaces and make the iron at the Antipodes. It is clear, however, that they are preparing themselves for emergencies. The rapid exhaustion of the hematite ores in this country has already driven them to import with increasing avidity from Elba, and send on lines of steamers to bring it from Spain; for the greatly augmented and augmenting demand for steel forewarns the British iron master that he must go even farther afield. He is doing it; and if the existence of supplies of fuel and ore at the Antipodes threatens to entice capitalists to compete with the iron master at home in the furnishing of the Antipodean market, then it is clear, from what is now taking place, that the iron master of Great Britain is putting himself into a position to make iron himself at the door of the consumer. If he is to lose the American trade by reason of American enterprise, he will not consent to any one taking away his customer at the other side of the globe."

This is, I do not doubt, quite true, and demonstrates that at no distant date the iron trade of this habitable globe will be fought for fiercely and sought after with an avidity with which the present competition will bear no sort of comparison—were comparison possible with a matter which as yet is not, so far as "Brummagem" and the United States are concerned. It will be interesting for your readers to peruse the following tabulated statement, for which I am indebted to Mr. J. B. Gould, U. S. Consul at Birmingham, giving an accurate statement of the business of the Birmingham district with the States during the year ending Sept. 30, and a comparison with three former years:

Description of Goods.	Dec. 30,	Quarters ended	Sept. 30,	Total for twelve months.	Previous year.
Hardware, steel and iron	£101,025 11 6	£390,671 16 5	£289,645 5 0	£780,342 13 11	£1,358,390 16 8
Sheathing metal	3 2 6	4,113 19 9	2,400 16 2	9,516 18 5	47,781 15 3
Iron cotton bale hoops	6,118 6 9	4,649 19 8	4,758 18 4	15,526 4 9	24,482 13 6
Anvils and vices	19,641 6 9	4,988 5 1	17,114 15 6	41,744 7 4	88,023 3 3
Tin plates	12,135 0 2	5,264 4 1	5,964 15 2	23,363 19 5	30,538 16 8
Chains, hoes and scythes	84,428 0 0	4,649 19 8	15,760 18 4	104,838 18 0	88,023 3 3
Saddlery and skins	9,679 7 1	6,472 4 2	6,492 13 1	22,644 4 4	30,538 16 8
Guns and implements	34,718 0 9	19,405 12 5	17,018 6 9	71,141 19 11	88,023 3 3
Needles and buttons	28,218 0 0	17,284 4 0	17,284 4 0	62,786 8 0	88,023 3 3
Watches and materials	2,316 4 0	1,324 4 0	1,324 4 0	4,964 12 0	6,618 16 0
Cotton and silk goods	3,896 7 0	2,597 18 0	1,298 19 0	7,793 4 0	10,391 12 0
Boot materials	3,968 10 1	4,767 4 7	1,825 15 0	11,053 15 8	14,738 1 0
Glass (sheet and ware)	17,986 13 0	16,954 8 8	9,008 2 8	43,948 4 4	58,597 18 0
Pens and tips	6,312 19 6	4,832 12 9	4,543 16 7	15,689 9 10	20,919 14 0
Jewelry and fancy goods	19,347 18 10	10,621 13 10	2,250 10 0	32,220 3 8	42,960 5 0
Chandeliers	2,060 16 0	1,236 10 11	1,236 10 11	4,533 18 10	6,045 15 0
Nickel and cobalt	1,402 0 0	1,229 10 1	2,220 12 0	4,852 2 1	6,469 12 0
Oil (coal and imitation)	6,405 15 8	8,332 1 5	1,667 2 0	16,404 19 1	21,873 4 11
Sundries and Parkes	2,804 6 4	11,139 13 4	1,229 12 8	15,173 12 4	20,231 9 5
Total for Birmingham	376,351 6 5½	219,440 10 0	115,978 16 8	711,770 12 1½	949,027 0 2
Total for Wolverhampton	278,861 6 6½	170,974 5 8	112,667 0 3	562,502 12 6½	749,670 2 1
Total for Birmingham and district	£655,212 12 12	£390,414 16 8	£228,645 16 11	£1,274,273 4 8	£1,698,697 2 3

Total for Birmingham and district	£309,744 5 0½	£208,477 17 4	£226,118 15 0	£538,196 17 4½	£1,358,390 16 8
Total for Wolverhampton	£345,468 0 0	£190,671 16 4	£114,527 1 8	£650,667 2 0	£1,358,390 16 8
Total for Birmingham and district	£655,212 12 12	£390,414 16 8	£228,645 16 11	£1,274,273 4 8	£1,698,697 2 3

	Value for year ending Sept. 30,	
Number of invoices certified		5,912
" " "		7,105
" " "		7,063
" " "		6,283
Total value for year end'g Sept. 30,	1870	£1,105,147 10 8½
" " "	1871	1,638,437 0 8½
" " "	1872	1,783,204 4 10½
" " "	1873	1,533,390 16 8½

You will observe that there is a considerable falling off from the figures of last year.

The Glasgow warrant market has again been irregular, and prices are now quoted at about 113/9 to 114/, for cash, after having been down as low as 110/6. Makers' prices are also lower, albeit some what irregular. They are as under: Gartsherrie, No. 1, 125/; No. 3, 120/; Coltness, No. 1, 127/6; No. 3, 116/; Summerlee, No. 1, 117/6; No. 3, 112/; Carnbroe, No. 1, 120/; No. 3, 112/; Monkland, No. 1, 115/; No. 3, 112/; Clyde, No. 1, 115/; No. 3, 112/; Govan, No. 1, 115/; No. 3, 112/; Langloan, No. 1, 120/; No. 3, 114/; Calder, No. 1, 120/; No. 3, 112/; Glengarnock, No. 1, 120/; No. 3, 115/; Eglinton, No. 1, 115/; No. 3, 112/; Dalmellington, No. 1, 115/; No. 3, 112/; Carron, No. 1, 120/; Shotts,

No. 1, 125/; No. 3, 115/; Kinneil, No. 1, 117/6; No. 3, 110/.

Shipments are looking up, being 3000 tons more than during the preceding week, but still 1600 tons below the corresponding week of 1872. Manufactured iron is rather easier, but the shipbuilders are well employed. There are at present 50 iron vessels on the stocks in the Clyde. The following gives the makers' name and number of vessels: Barclay, Cushe & Co., Stobcross, 1; Aitken & Mansel, Kelsinhaugh, 1; Messrs. Napier & Son, Govan, 3; London & Glasgow, Govan, 4; Dobie & Co., Govan, 2; Messrs. A. & J. Inglis, 2; Henderson Bros., Pastrath, 1; Gleber & Co., Govan, 4; Stephens & Son, Linthouse, 8; Barclay, Cushe & Co., Whiteinch, 2; Wingate & Co., Whiteinch, 3, and a small dredger; Aitken & Mansel, Whiteinch, 2; J. G. Lawrie, Whiteinch, 1; Chas. Connell & Co., Scotstown, 5; Wm. Seniors & Co., Renfrew, 3; Henderson, Coulborne & Co., Renfrew, 2; J. & G. Thomson, Dalmaig, 6, and a small dredger.

Whilst on this subject I may quote the description given by a metropolitan journal of a new Thames steamer, called the Enterprise, which has been built for the Secretary of State for India, for service at Port Blair—the convict station at the Andaman Islands, at which Lord Mayo was assassinated. "The vessels and machinery have been constructed by Messrs. J. & W. Dudgeon, of Cubitt Town, Poplar. She is 609 11-94 tons b. m., 150 horse-power nominal; length, 185 feet; breadth, 26 feet; depth, 15 feet; schooner rigged. She left Gravesend at noon, having a party of scientific gentlemen and others interested in steam navigation on board, the Secretary of State being represented by the Hon. G. C. Talbot, Director-General of Stores, and proceeded down the river to make the necessary trials on the measured mile on the Maplin Sands. Four runs were made, and the following results obtained: The first mile was run in 4m. 10s., equal to 14·4 knots; engines, 84 revolutions; steam, 60 lbs.; vacuum, 27½. Second run in 5m. 50s., equal to 10·25 knots; engine, 84½ revolutions; steam, 60 lbs.; vacuum, 27½. Third run in 4m. 10s., equal to 14·4 knots; engines, 84 revolutions; steam, 60 lbs.; vacuum, 27½. Fourth run in 5m. 40s., equal to 10·58 knots; engines, 84; steam, 60 lbs.; vacuum, 27½. The mean of these runs being 12·4 knots. The vessel's draught was 13·9½ mean; area of midship section, 320 feet; area of load-line, 3600 feet; displacement, 1050 tons; indicated horse-power, 754."

There is little or no noteworthy change to record in the Cleveland district, the approaching revision of wages and quarterly meetings tending to limit transactions. In the Sheffield district the first of the month has brought an advance in the price of coal, as is also the case in other districts, and this time of a larger amount and of a more general character than was the case on September 1st. It varies in extent from 1/ to 3/ per ton, and is in most cases on the various kinds of house coal only. One of the principal coal owning firms in the vicinity of this town quotes the following prices in its new circular, and intimates that all orders will be executed at them unless cancelled by return of post: Picked branch coal, 24/; best Birley silkstone, 21/; screened silkstone nuts, 15/; screened seconds coal, 16/; and coke breeze, 15/, all per ton of 21 cwt. at the pit mouth. Carriage to Sheffield increases these rates by about 2/ to 2/6 per ton. Other firms have put up prices 2/ to 3/ per ton, making best coal 27/ to 28/ delivered; but it may be taken as an undoubted fact that very good house coal can be bought at from 20/ to 23/ per ton. In steam coal and engine slack the advance is by no means general, and I hardly anticipate that it will become so. Coke for melting purposes is still 40/ per ton for local made, or about 49/ to 50/6 for North Country qualities.

The reason for these repeated advances is difficult to discover, and, in fact, they do not appear to be warranted by the positive state of trade, but are chiefly owing to the fact that buyers from the London market are in the locality offering a shilling per ton more than the local merchants care to give. There was a time, and that, too, not remote from the present, when the South Yorkshire and East Derbyshire colliery proprietors were glad to look upon Sheffield as one of their best markets for the better kinds of house coal, but that feeling has apparently vanished altogether in the face of the growing necessities of the metropolis. Stocks have been well kept down during the summer months, so that the coal panic of last winter is not unlikely to be repeated within the next six months. The Sheffield merchants grumble quite as loudly about the rise as the general public; in fact, they allege that their profits are minimized to such a degree as to render it hardly possible to continue business on a safe footing. What is here remarked is perfectly true of every other district in the kingdom.

Within the past few weeks there have been an unusually large number of failures here amongst small traders and tradesmen, and this week a petition for liquidation has been filed by Mr. J. J. Bagshawe (trading as J. J. Bagshawe & Co.), of the Thames Steel Works, Sheffield. The liabilities are stated at something like £12,000, with considerable assets. In another case, that of a tradesman, the liabilities are about £10,000. If I am correctly informed—and I can, personally, rely upon the information—it is not impossible that we may hear of others, one or two on a large scale, in various branches of business.

A local newspaper records the "rumored removal of a Sheffield steel business to the United States," owing, it states, to "the fact that Bilbao ore is being imported into the States and made into steel at a much lower rate than Sheffield firms can sell at." This I do not dispute; but I may add that it is a pretty well known fact that more than one of our leading Sheffield steel houses are engaged or interested in Pittsburgh or Philadelphia, and that, although ore is being sent to the States, most of it is obtained from Northern Africa or Elba, very little going from Bilbao. There is nothing, in any case, to prevent Sheffield firms having branch works in the States, except, perhaps, the absence of that peculiarly skilled labor required for making the various better kinds of steel. Generally speaking, there is no change in the condition of the steel trade, but on the whole it is hardly so well employed as of late.

It is understood that Mr. Hampton, of the Phœnix Steel Works, near Sheffield, proposes by patent to *cast* armor plates direct from the Bessemer converter, instead of piling and rolling them, as at present. I do not, of course, offer any opinion on the subject, but the project is certainly novel, and the result of its application will be regarded with interest. The armor plate mills here are well employed on home and foreign orders, and are stated to have good prospects before them.

In cutlery very little is being done, and the panic on your side is not likely to improve the demand thence. I hear of one or two Sheffield houses having lately been "let in" for heavy or moderately heavy amounts by American houses which have gone the way of all (commercial) flesh.

The general trades of Birmingham are fairly busy. The iron trade of the district and of South Staffordshire are referred to at the head of this communication. In my next I shall probably have occasion to dwell at greater length on this branch of my review.

From South Wales news is rather notable for its absence. The new proprietary of Cyrfarthfa have, it is stated, bought the Cœdcæ Colliery. It is understood that they intend to build new steel works and mills, and, generally, to bring up Cyrfarthfa to the level of its great rival Dowlais, by extensions and the vigorous employment of an immense capital. The stock of native and foreign ores at Dawlais and Cyrfarthfa is immense. It need be, seeing that yesterday an advice was issued, intimating that Bilbao may be regarded as closed at present against foreign vessels. Mr. D. M. Gordon, managing director of the Landore-Siemens Steel Company (Limited), whose works are situate near Swansea, states that they have been manufacturing spiegeleisen of the purest kind, with from 10 to 20 per cent. of manganese, and without using any spathic ore whatever. Mr. Gordon thinks that to their manager, Mr. James Riley, is due the credit of being the first to manufacture spegel on a commercial scale in Great Britain without using spathic ore. The coal miners in this district (Wales) are, as I stated last week, determined to resist the discharge note, and are now pledging themselves to fight the matter to the very utmost.

The *Metal* market is dull and comparatively inactive. The *Mining Journal* says: On Monday the market was without animation, and Chili bars, g. o. b., were nominally £83 to £84, and Wallaroo, £92 to £93. On Tuesday 100 tons Chili ore and 200 tons regulus were sold at 16/3 per unit; 50 tons Lota realized £82. 15/, cash; and 25 tons g. o. b., £82. 12/6, net. On Wednesday there were buyers of Chili bars, g. o. b., at £82, cash; 25 tons Wallaroo sold at £92, cash, the market closing with buyers at this price; 15 tons, with one month's prompt, realized £92. 12/6. On Thursday the market showed some little animation; 50 tons, g. o. b., changed hands at £83, cash; 25 tons, £83, one month; 25 tons, £84/5, three months; and 25 tons Lota, £82/10, cash; 40 tons Burra, £92, cash. In addition to the foregoing transactions in foreign the following was reported: 100 tons English tough at £91 on smelters' terms. A small quantity of English favorite brand has realized £92; common, however, is offering £90. 10/. There are buyers of Chili bars, g. o. b., at £83, cash. Yellow metal is quoted 8¾d.

Lead.—This metal continues entirely without change. Good soft English pig is quoted £23. 15/ to £24. LB. and Spanish £23. 5/ to £23. 7/6.

Spelter.—The Stock in London of Silesian, on Sept. 30th, last, was 387 tons, as against 1190 tons last year at the same period, and 380 tons at Grimsby, as against 600 on the 30th Sept., 1872. The market remains quiet, and Silesian is quoted £26. 10/ to £27. 10/, according to brand.

Tin.—The market has had a declining tendency during the week, and holders seem at the moment to have lost confidence, and speculators appear to have abandoned the metal altogether until more reliable information can be obtained with regard to the supply of Australian ore. The accounts hitherto received have varied a good deal as regards the cost of production, and the ore which has been put up for sale has shown a very wide margin in percentage, some being as low as about £15 per ton, and others as high as about £90. There are various opinions stated with reference to the cost of production—some asserting that at present prices the importations of Australian ore realize a loss, while others maintain that even at a much lower price it can be laid down to a profit. Until the cost of production can be ascertained there must of necessity be some considerable hesitation on the part of dealers generally. The market may probably remain in a doubtful condition, or, perhaps, recede, as the demand for tin plates is very dull at present. A small quantity of Straits was sold at £121. 10/. The standards of tin ore were reduced on Tuesday, and are now—Superior common, 116/; superior fine, 118/.

Messrs. Van Houten & Ebeling, of Rotterdam, report, under date September 30th, as under: The tin market has been weak and irregular this month, and the quotations show a further decided decline in prices. The Dutch Trading Company's first autumn sale, announced on September 2d, took place on September 25th, when 30,055 slabs Banca were sold at 74½fl. to 76fl.; average, 75·05fl. In Banca there has been a limited amount of business; from 79fl. the prices gradually gave way to 76fl. Since the sale, 75fl. to 75½fl. has been paid. Billiton has been in moderate request, and the price declined to 75fl.; during the last days some business is reported at 74fl. The greater part of to-day's heavy stock is withdrawn from the market. In the beginning of next month a public sale, comprising 9000 piculs Billiton, will take place at Batavia. The position of Banca tin in Holland on September 30th, according to the official returns published by the Dutch Trading Company, was:

	1873.	1872.	1871.
Import in September...Slabs,	28,136	30,344	9,139
Total nine months.....	170,623	94,282	138,990
Deliveries in September.....	7,800	7,471	6,226
Total nine months.....	95,319	72,867	91,165
Stock second-hand.....	44,351	14,000	48,546
Unsold stock.....	131,918	73,817	122,932
Total stock	176,269	87,817	171,478
Afloat.....Piculs,	3 165	13,400	7,450
Statement of Billiton:			
Import in September..Slabs,	13,700	15,172	
Total nine months.....	59,900	56,074	35,845
Deliveries in September.....	1,800	11,697	3,550
Total nine months.....	47,050	44,460	34,194
Stock.....	27,703	15,270	3,051
Afloat.....Piculs.	4,125	8,327	5,971
Quotation } Banca.....	75 fl.	94 fl.	80½ fl.
Sept. 30, } Billiton.....	74	90⅛	79⅛

These returns of Banca and Billiton for 1873, compared with those for 1872, exhibit a decrease of the import for September of 112 tons, an increase of the import for the nine months of 2505 tons, a decrease of the deliveries for September of 299 tons, an increase for the deliveries for the nine months of 782 tons, an increase of the stock second-hand of 1337 tons, an increase of the unsold stock of 1816 tons, an increase of the total stock of 3153 tons, a decline of the quotation of Banca of £3. 15/ per ton. The government returns for the month of July are as follows:

EXPORT OF TIN FROM HOLLAND.

	July.			Seven months.		
	1873.	1872.	1871.	1873.	1872.	1871.
Germany ..tons.	193	171	213	1,874	1,588	1,784
England.....	34	28	79	1,040	114	870
Belgium.....	79	121	194	651	695	580
France.....	23	18	156	348	80	451
Hamburg.....	16	97	20	187	197	157
United States....	..	..	..	..	..	3
Other countries..	5	4	81	123	160	318
Total.....	350	369	743	4,223	2,834	4,123

The New Bridge at St. Louis.—The Commission of United States Engineers, appointed by the War Department some time ago to examine and ascertain whether the bridge now in process of construction across the Mississippi at St. Louis will, when finished, obstruct navigation, have made an elaborate report. They find the bridge, as at present designed, will prove a very serious obstruction to navigation, and as it is impracticable to change the plans of the bridge, or raise it, except at an enormous expense, they recommend a canal or open cut behind the eastern abutment of the bridge, 125 feet wide, extending from a point 500 feet above the bridge to 300 feet below it, with a draw of the same width. They also recommend that arch trusses like those of this bridge be in future prohibited in plans for bridges over navigable streams.

GLASS CUTTERS.

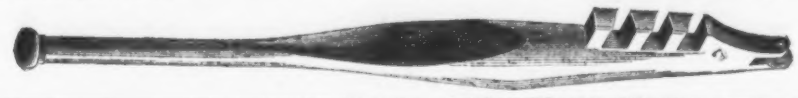
Our Glass Cutters are made with a handle like a Glaziers' Diamond, but instead of the diamond point they have a small hardened steel revolving wheel, the sharp edge of which cuts nearly as well as a diamond. They are durable and will give entire satisfaction.

Most Hardware Dealers keep them, or will send to us for them if wanted. Where they are not for sale, we will send one by mail, prepaid, on receipt of thirty-five cents. We will send one to any publisher who will insert this notice and forward us a copy prepaid.

MILLERS FALLS CO.,

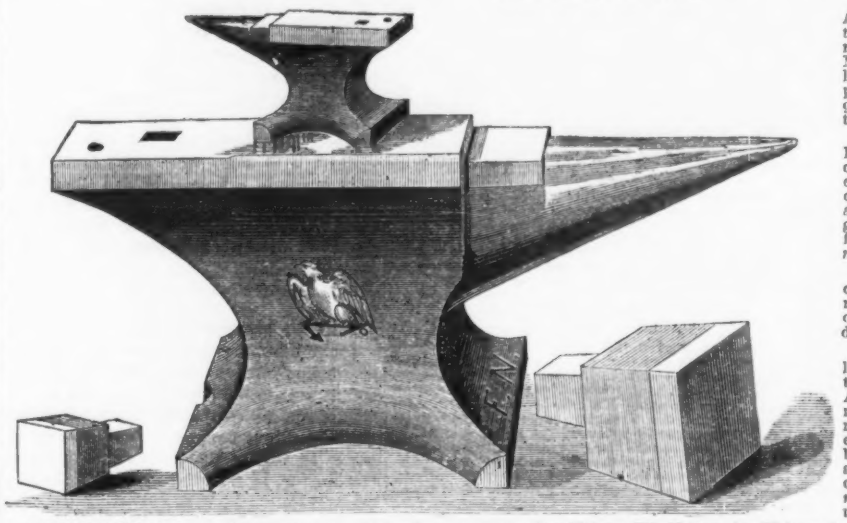
78 Beekman Street, New York.

Also Manufacture Barber's Bit Braces, Parallel Vises & Drilling Machines,



The Fisher & Norris Eagle Anvil Works.

(ESTABLISHED 1843.)



These Anvils are manufactured at the oldest Anvil Factory in this country, and for the past twenty-five years have maintained an excellent reputation among Blacksmiths, Machinists, Tool Makers, &c. They are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, after being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off*.

The best of English Anvils, after a time, become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils being of crystallized iron, no such settling can ever occur; and the steel face, therefore, remains perfectly true. Also, it has the great advantage that being of a more *solid* material, and consequently with less rebound, the piece being forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as is the case from a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *somewhat lighter* than that required when using a wrought iron anvil which is more elastic.

FISHER & NORRIS manufacture also, to special order, Anvils for Saw Makers, File Makers, Axe Makers, &c; also, Copper Smiths', Silver Smiths' and Tinmen's Stakes and Blocks, with hardened and polished cast steel faces, and the well known Double Screw Parallel Vise.

PRICE LIST, May 1st, 1873.

ANVILS weighing 100 lbs. to 600 lbs., 12 cts. per lb.

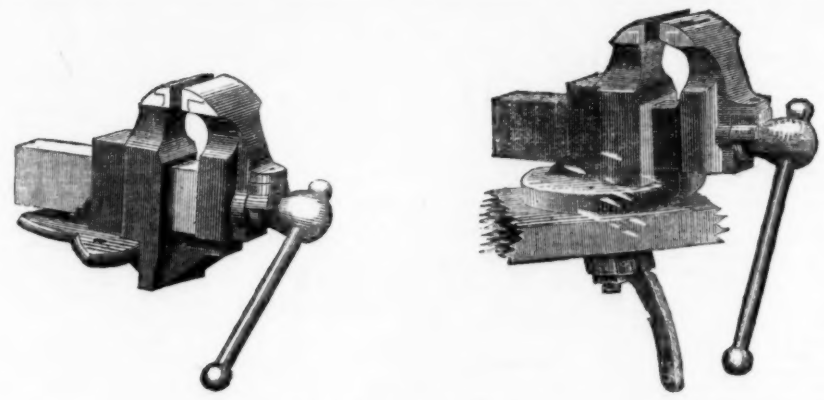
Smaller Anvils, ("Minims.") No.	0	1	2	3	4	5	6	7	8	9
Weighing about	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price,	$4·00	$5·00	$6·00	$6·50	$7·00	$8·00	$9·00	$10·00	$11·00	$11·50

THESE GOODS ARE SOLD BY OUR AGENTS (with usual discounts to the trade).

New York.—Messrs. CLARK, WILSON & CO.—RUSSELL & ERWIN MANUFACTURING COMPANY.—Messrs. DURRIE & RUSHER. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.

FISHER & NORRIS, Trenton, N. J., Manufacturers.

HOWARD
PARALLEL BENCH VISE.



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TRIPLE ACTING RATCHET DRILL, the Simplest, Cheapest and Best.

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HAMMERS,
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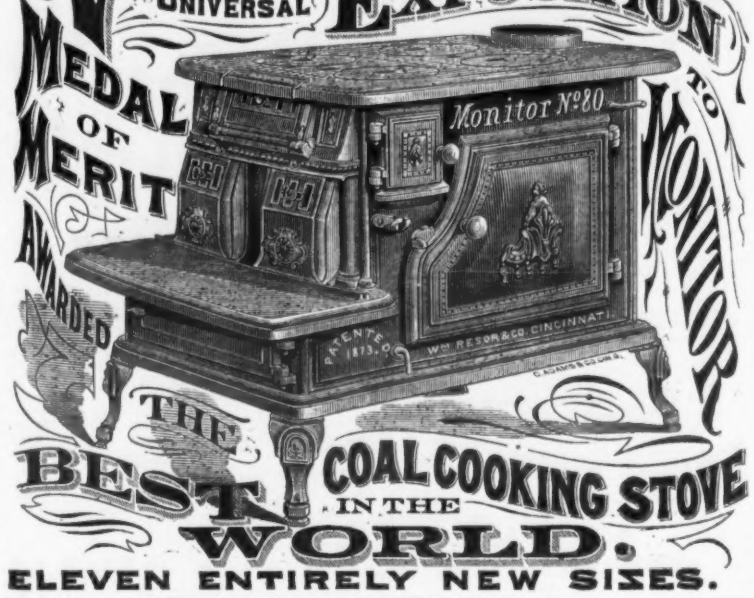
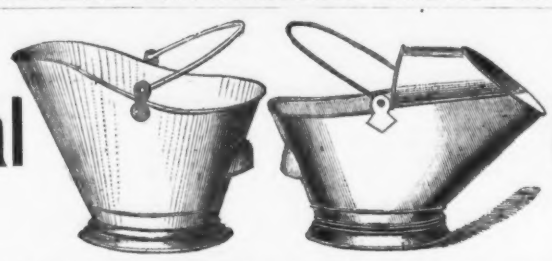
VIENNA UNIVERSAL EXPOSITION

MEDAL OF MERIT AWARDED TO MONITOR



THE BEST COAL COOKING STOVE IN THE WORLD.

ELEVEN ENTIRELY NEW SIZES.

Coal  Hods.

STAMPED CORR GATED RIVETED BOTTOM IN SIX STYLES.

SMITH, BURNS & CO.,

Manufacturers of

Galvanized and Japanned Sheet Iron Goods and Tin Ware, Fry Pans, Broilers, Ash Cans, Garbage Buckets, Chamber Pails, Tea Kettles, Wash Boilers, Water Pails, Well Buckets, Toilet Ware, &c., &c. Exclusive manufacturers of the **Patent Combined Chamber and Commode Pail. Stamped and Planished Ware.**

Warehouse, 46 Cliff Street, between Beekman and Fulton Streets, NEW YORK.

THE PALACE COAL VASE.

A COAL VASE

AND

Shovel & Tongs

STAND

COMBINED.

PATENTED

December 24th, 1872.

ORNAMENTAL,

Clean and Convenient.

Dealers will find them very saleable, as they are the most popular Coal Vase in market. Illustrations and prices supplied upon application. Address the

Sole Manufacturers,

SIDNEY SHEPARD & CO., Buffalo, N. Y.

AGENTS.—VAN WART & McCOY, 43 Chambers Street, N. Y.; SHEPHERD & LLOYD, 405 Commerce Street, Philadelphia.

TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

ShiveGovernorCo

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR.

The Best and Cheapest Watcher of the Watchman made.

PRICE ONLY $15.

Circulars sent free

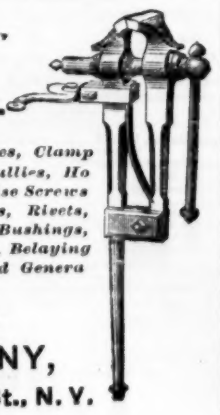
WILSON MANUFACTURING COMPANY.,

NEW LONDON, CONN.

MANUFACTURERS OF

SOLID BOX VISES.

With or without Convex and Concave Washers.



Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads and Screws, Parallel Bench Vises, Sash Pullies, Ho House Pullies, Composition Cocks, Bench Screws, Vise Screws Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and Genera Hardware.

GALVANIZING DONE TO ORDER.

WILSON MFG. COMPANY,

Warehouse 37 Chambers St., N. Y.

Fire Brick.

B. KREISCHER & SON.,

New York Fire Brick &

STATEN ISLAND

CLAY RETORT WORKS,

Established 1845.

Office, 58 Goerck Street, cor. Delancy Street,

East River, New York.

The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand, from my own mines at New Jersey and Staten Island, by the cargo or otherwise.

Philadelphia Fire Brick

AND

Clay Retort Works,

AND KENSINGTON FIRE BRICK WORKS.

Office, 23d and Vine, Philadelphia.

PHILIP NEWKUMET,

Successors to **JOHN NEWKUMET, Proprietor** manufactures 9-inch Fire Bricks, Tiles, and Blocks, for Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Glass Houses, &c., &c

Articles of every description made to order at short notice, and in a very superior manner.

"CLAY RETORTS FOR SUGAR HOUSES."

A. HALL & SONS, Perth Amboy, N. J

ESTABLISHED 1846.

HALL & SONS, Buffalo, N. Y.

ESTABLISHED 1866.

FIRE BRICK

of reliable quality for all purposes, manufactured of the best New Jersey Fire Clays. Also, MINERAL KNOBS, ROCKINGHAM WARE, Fire Clay, Fire Sand, Kaolin and Ground Fire Brick.

BLACK LEAD

CRUCIBLES.

Manufactured by

ADAM NEWKUMET,

1537 & 1539 N. Front St., Phila., Pa.,

For Steel, Brass, Nickel, Copper, Bronze, &c.

Equal to any in the market, and all guaranteed.

☞ Keeping a full stock of all sizes on hand, and being confident of giving *entire satisfaction*, we respectfully ask consumers to give us a trial

---

Watson Fire Brick Manufactory,

ESTABLISHED 1836.

JOHN R. WATSON, Perth Amboy New Jersey,

Manufacturer of

FIRE BRICK,

For Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Tanneries, Boiler and Grate Setting, Glass Works, &c.

FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE.

Salamander & Albany Fire Brick Works

Rathbone St., Albany, New York.

PALMER, NEWTON & CO.,

Manufacturers of **FIRE BRICK** of every shape for Gas Works, Tanneries, Lime Kilns, Rolling Mills, Blast Furnaces, Glass Works, Stove, Range and Heater Linings; Fire Clays, Kaolin, Fire Sand, Fire Cement, by cargo or barrel. Orders filled on short notice.

Brick Presses.

BRICK PRESSES,

For Fire and Red Brick.

PATENT STEAM GEARING

For grinding Clay for Red or Fire Brick, and all kinds of **Brick Machines** in general.

Works, 1819 Germantown Ave., Phila.

GEO. CARNELL.

Oldest and Largest Establishment of the kind in the U. S.

F. L. & D. R. CARNELL,

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Manufacturers of Pennsylvania Brick Machine, Little Giant Pipe Machine, Fire and Red Brick Presses, Clay Wheels, Tile Machines, Stampers, Grinding Pans. Brick Yards fitted out for running by steam or horse. Heavy and Light Castings. Send for circular.

MYERS MFG. CO.,

209 Centre Street, N. Y.

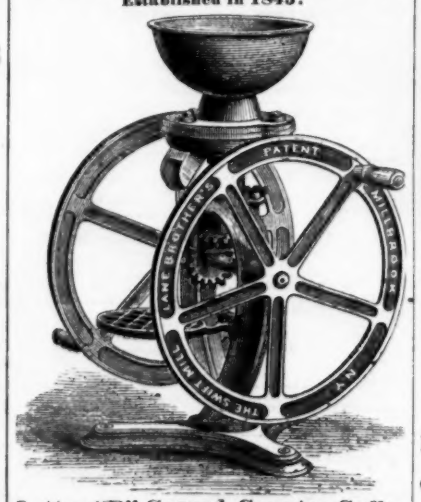
Manufacturers of

FLUTING MACHINES,

Stand Sad Irons, Polishing Irons, Toilet Irons, Towel Racks, &c.

The Swift Mill.

Established in 1845.



Letter "B" Geared Counter Coffee or Spice Mill.

Stands nearly 2½ feet high. Is highly finished, colors deep Vermilion and Gold. We make more than 20 different styles and sizes.

Send for catalogue. Manufactured exclusively by

LANE BROTHERS, Millbrook, N. Y.

TORREY'S PATENT WEATHER STRIPS.

An Agent wanted in every town in the United States.

Send for Circular

E. S. & J. TORREY,

164 & 166 Fulton Street, N. Y.

J. D. FARRINGTON, Jr.,

38 Murray Street, New York,

MANUFACTURER OF

Japanned, Plain and Stamped Tin Ware,

TOILET WARE a specialty,

Manufactured of IXX Tin and Ornamented in Varied and Elegant Designs.

SOLE MANUFACTURER OF THE PATENT

Self-Righting Cuspadore,

With Cast Iron Bottom, and

FOOTE'S PATENT LOCK UMBRELLA STAND.

THE CORRUGATED STOVE PIPE ELBOW,

Strong,

Durable,

No Soot,

Cheap.

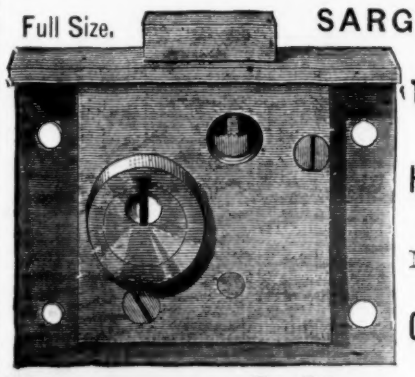
Better Draft.

MANUFACTURED BY

SELLEW ELBOW CO.,

48 Cliff Street, NEW YORK. 27 North Canal Street, CHICAGO.

Full Size.



SARGENT & GREENLEAF'S

Celebrated

UNPICKABLE LOCKS.

Drawer, Trunk,

HOUSE AND STORE DOOR LOCKS

PAD LOCKS,

Night Latches, Etc.,

WITH FLAT GERMAN SILVER KEYS.

Combination Bank and Safe Locks.

Also the

Patent Adjustable Elbow.

For Stove, Furnace, Conductor, and all other Sheet Metal Pipes, With Universal Adjustable Joints.

Can be changed at will to any desired angle. Its advantages over all other Elbows are at once apparent.

For Beauty, Strength and Durability it is Unequaled.

Manufactured by

Sargent, Greenleaf & Cole,

P. O. Box 4498. **300 Broadway, N. Y.**

Send for Catalogue and Price Lists.

New York Wholesale Prices, October 22, 1873.

HARDWARE.

Anvils.
Solid Cast Steel ⅌ ℔ 14c
Wright's ⅌ ℔ gold 13c ; over 250 ℔s 12½c, gold
Armitage's Mouse Hole gold 12c
Wilkinson's ⅌ ℔ gold 11½c
Eagle Anvil Co. ⅌ ℔ 13c dis 15 @ 15&5 %

Apple Parers.
Turn Table } $8·50 ⅌ doz
Lightning }
Conqueror }
Reading ⅌ doz 8 00
Union ⅌ doz 9 00 } dis 5 %
Bay State, Paring, Coring and Slicing 15 00 }
Skeleton " " " 9 00 }
Climax Slicer 9 00 }
Bay State Peach Parer $11 00 @ 11 50
Lightning " " 11 00 @ 11 50
Peach Stoner and Halver 7 00

Augers and Bits.
Snell Mfg. Co. dis 15 @ 20 %
Russell Jennings dis 10 %
Douglass Mfg. Co., Extra dis 25 %
" " No. 1 dis 25&5 %
" " Hollow Augers dis 25 %
Cushman's Expanding Hollow Augers dis 20&10 %
Ives' dis 25 %
" Hollow Augers dis 30 %
" Expansive Augers dis 30 %
" Bits dis 25 %
Andrews' Bits dis 20 %
Cook's Patent Augers dis 30&10 %
" " Bits dis 25&10 @ 30&10 %
Shepardson's Double Cut Bits dis 20 %
Griswold's Patent dis 20 %
Cast Steel Cut Augers dis 30&10 %
" Auger Bits dis 30&10 %
Long Augers new list dis 30 %
Bonney's Patent Hollow $48 per doz—dis 25 %
Stearns' " " $48 per doz—dis 30 %
Morse's Bit Stock Drills dis 20 %

Axes.
Blood's $12 50 @ 14 00
Hunt's ⅌ doz $15 00 @ 17 50 net @ dis 5 %
Collins' ⅌ doz 12 00 @ 16 00 net @ dis 5 %
Hurd's ⅌ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s ⅌ doz 13 00 @ 15 00
Simmons' ⅌ doz 12 00 @ 13 50
Morris' ⅌ doz 12 50 @ 13 50
Red Jacket ⅌ doz 12 00 @ 12 50
Mann's ⅌ doz 12 50 @ 13 00
" Double Bitted ⅌ doz 21 50 @ 22 00
Powell Tool Co., "Peerless" ⅌ doz 13 00 @ 14 50
Underhill's ⅌ doz 12 50 @ 13 50
" Crown ⅌ doz 13 00 @ 14 00
John Leverett's ⅌ doz 12 50 @ 15 50

Balances.
Chatillon's } new list dis 15 %
Frary's }
Morton's }

Bands.
Plated add 10 ; dis 5 %
Iron dis 15&5 %
Brass (Plated list) dis 5 %
Oroide add 15 ; dis 5 %

Bells.
Hand, Light Brass dis 60&10 %
White Metal dis 45&10 %
Globe dis 20 %
Swiss Hand dis 10 %
Abbe's dis 10&10 %
Taylor's Patent Door net
Western Gong net
Brook's Crank net list
" Pull dis 15 %
Hart Mfg. Co., Crank and Pull new list dis 50 %
Cow—Common Wrought new list dis 33⅓ %
Western new list dis 33⅓ %
Kentucky "Star" new list dis 20 %
Dodge's Genuine Kentucky new list dis 25 %
Yaw's Genuine dis 20 %

Bellows.
Blacksmiths' dis 10 %
Moulders' dis 15 %

Blind Fasteners.
Van Sand's ⅌ gross $14 00
Washburn's Patent ⅌ gross 14 00
Merriman's add 35 @ 40 %

Blind Staples.
Boardman's Patent, ⅝ in. and larger ⅌ ℔ 37½c
" ⅜ in " 42 c

Bolts.
Carriage and Tire, Ætna Nut Co dis 60 %
Stove, Ætna Nut Co dis 10&5 %
Cast Iron Barrel, Shutter, &c old list dis 50&10 %
Wrought Iron Barrel net
" " Square dis 10&10 %
Carriage and Tire, Common dis 70&10 %
" " Norway Iron dis 40 %
Star, Philadelphia dis
Eagle, Philadelphia dis
Philadelphia Pattern, P. S. & W dis 50&10 %
Carriage and Tire, R. B. & W old list dis 50&5 %
Plow, R. B. & W dis 30 %
Stove, R. B. & W dis 10 %
" Shelton Co. Shaved Heads dis 10 %
Union Nut Co., old list dis 50&15 %
Machine dis 25 @ 30 %

Borax.—Per case of 100 lbs. ⅌ ℔ 22c

Boring Machines.
Kellogg's dis 10 @ 15 %
Snell Mfg. Co., Rice's Patent dis 15 %
" " Regular dis 15 %
Douglas Mfg. Co dis 20 %
Hovey's Angle $6 00 @ 6 25
" Upright 4 25 @ 4 50
Morticing Machines each $18 00

Bow Pins. dis 45 @ 50 %

Braces.
Barber's Patent dis 40 %
Wilson Mfg. Co net @ add 5 %
Spofford's Patent dis 40 %
Mobie's Patent dis 33⅓ %
Bartholomew's American Ball dis 10&10 %
" Patent Grip dis 40 %
Q. S. Backus & Co dis 30&10 %

Bung Hole Borers.
Common and Ring dis 20 %
Enterprise Mfg. Co dis 20&5 %
Ives' Tap Borers dis 20 %

Butchers' Cleavers.
Bradley's dis 15 %
Beatty's new list dis 10 %
2 3 4 5 6 7 8 9
$19·00 $21·50 $24·00 $27·00 $30·00 $33·50 $36·50 $40·00
Hart Mfg. Co dis 45&10 %
0 1 2 3 4 5 6
$25·25 $29·75 $30·25 $38·75 $43·55 $48·50 $54·00

Butts.
Wrought Brass new list dis 20 %
Cast Fast Joint, Narrow dis 40 %
" " Broad dis 40 %
Cast Loose Joint dis 50 %
" " Mayer dis 40 %
" " Parliament dis 40 %
Loose Pin dis 40&10 %
Wrought Fast Joint, Narrow dis 30 @ 30&5 %
Wrought Broad dis 35 %
" Loose Joint dis 35 %
Wrought Table and Back Flaps dis 25 @ 25&5 %
Cast Butts, Ohio Butt Co.—
Narrow Fast, Drilled and Wire Jointed (old list) dis 35 %
Broad Fast, Drilled and Wire Jointed dis 35 %
Broad, Loose, Drilled and Wire Jointed dis 45 %
Silver Tipped dis 15 %
Loose Joint, Japanned dis 25 %
Loose Joint, Acorn and Silver Tipped dis 40 %
Palmer Blind Butts dis 30&10 %
Nicholson Blind Butts dis 40&10 %
Parker's Blind Butts dis 40&10 %
A. S. Parker's dis 40&10 %
Clark's Surface Blind Hinges, Nos. 1, 3 and 5 dis 40&10 %
" " " " No. 20 dis 50&5 %
" Mortise " " dis 30&5 %
Seymour's dis 40&10 %
Shepard's dis 40&10 %
Garretson's dis 40&10 %
Standard dis 40&10 %
Union Mfg. Co.—
Drilled and Wired Cast Fast dis 35 %
" " " " Loose dis 45 %
Loose Joint Japanned or Silvered Acorn dis 40 %
" " Figured Enameled dis 25 %
" " Nickel Capped dis 30 %
" " Solid Bronze dis 10 %

Caps—Percussion, per 1000.
G. D. 40c
Ely's E. B. 1-4s, 60c. ; 1-10s, 67½c., gold
Double Waterproof, 1-4s, $1·50 ; 1-10s, $1·57½c., gold
Colt's 1-4s, 72½c ; 1-10s, 82½c., gold

Cartridges.
Metallic dis 50 %

Cards.
Horse and Curry dis 25&10 %
Cotton new list dis 10&10 %
Wool new list dis 10&10 %

Casters.
Iron and Wood Wheel Plate new list dis 20&10 %
Brass Wheel Plate new list dis 20&10 %
Porcelain Wheel Plate new list dis 20&10 %

Chain.
English Coil net gold
⅌ ℔ 12¾ 10 9½ 8¾c 8½ 8¼c
3-16 ¼ 5-16 ⅜ 7-16 ½
Trace, 6½-10-2 ⅌ pair, gold, 69c
Trace, 7-10-2 ⅌ pair, gold, 61c
Galvanized Pump Chain ⅌ ℔ 14c
German Halter Chain new list, gold, dis 25 %
German Coil new list, gold, dis 25 %
Jack Chain, Iron dis 35 @ 40 %
" Brass dis 20 @ 25 %

Chalk.
White ⅌ gross, 60c
Red ⅌ gross, 80c
Blue ⅌ gross, 90c
Crayons ⅌ gross, 14c

Cherry Stoners.
"Family" ⅌ doz $9·00

Chisels.
Socket Firmers dis 60&5 @ 60&10 %
Socket Framing dis 60&10 %
Socket Corner dis 60&10
Tanged Firmers dis 40 to 40&10 %
Butcher's $5·50 to £ gold—new list
Newbould's $5·50 to £ gold
Spear & Jackson's $5·50 to £ gold—new list

Clips, Axle.
Norway or Best dis 20 @ 30 %

Superior dis 40&5 %
"Star," Superior, Philadelphia dis 45&5 %

Coal Shovels.
Iron Handled ⅌ doz, $ 85 @ 1 25
Wooden Handled ⅌ doz, 1 00 @ 2 00

Coal Hods.
Smith, Burns & Co dis 25 %
No. 14 15 16 17 18
Japanned $12·00 12·75 13·50 15·50 18·00 per doz
Galvanized 15·00 16·00 17·50 19·50 22·50 "
No. 14 15 16 17 18
Common Japanned $9·00 9·75 10·50 12·00 13·50 per doz
" Galvanized 13·00 14·50 15·50 17·50 19·50 "
Common Japanned dis 50&10 %
" Galvanized dis 40&10 %

Cocks.
Brass Racking dis 20&10 %
Lock and Globe dis 20&10 %

Coffee Mills.
Board and Box dis 15 %
Increase Wilson's new list dis 10 %
Selsor's Pat $9·50, $10·50—dis 20 %
French Steel dis 10 @ 20 %
"Champion" dis 20 %
Swift's dis 20 %

Compasses and Dividers.
Bemis dis 15&13 @ 20&5&15 %
Excelsior dis 30 %
Peck Stow & Wilcox dis 25 %

Coopers' Tools.
Bradley's dis 15 @ 20 %
Chas. E. Little dis 15 @ 20 %

Corn Knives and Cutters.
Bradley's list net

Crucibles.
Gautier & Co ⅌ No. 5½c

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass dis 15 %
Fitch's dis 15&10 %
Ruggles' dis 15 @ 20 %
Rubber ⅌ doz, $9·00—dis 10 %
Schweitzer Mfg. Co dis 20 %

Curtain Pins.
Silvered Glass dis 40&10 %

Cutlery.
American Table
American Pocket dis 15 %

Door Springs.
Gray's $7·50 per doz—dis 40&10 %
Torrey's Patent $7·50 ⅌ doz—dis 40 @ 40&10 %
Palmer's Japanned No. 6 ⅌ doz $5·00
" Coppered " " 6·00
" Silvered " " 8·00
Challenge.—
Japanned ⅌ doz $4 00 @ 6 00
Bronzed ⅌ doz 5 00 @ 7 00
Nickel Plated ⅌ doz 6 50 @ 9 00
1 Gross lots dis 10 %
5 Gross lots dis 20 %

Drawing Knives.
dis 60 @ 60&10 %
Bradley's dis 25 %

Drills.
Ingersoll's Ratchet dis 25 %
Moore's Triple Acting Ratchet dis 20 %

Egg Beaters.
Monroe's ⅌ doz net $8·25 @ 8·50
Ashley's ⅌ doz net 2·25 @ 3·00
Earle's Patent ⅌ doz net 5·50 @ 6·00
Pratt's Aerating dis 10 %
Dover ⅌ doz net $6·00

Emery.
Genuine Chester—Regular Nos ⅌ ℔ 8c } dis 5 @ 10 %
" Flour and FF ⅌ ℔ 5c }
Washington Mills—Regular Nos ⅌ ℔ 8c
" Flour ⅌ ℔ 5c

Enameled and Tinned Ware.
Kettles dis 15 %
Sauce Pans, Glue Pots, &c dis 10 %

Faucets.
Cork Lined, Wood dis 60 %
Fenn's dis 50 %
" Cork Stops dis 40 %
Star dis 55&10 %
Frary's Patent Petroleum dis 10&10 %
Taylor's Pattern " dis 20&10 %
Wood and Metallic dis 40 %

Files.
Nicholson $5 00 to £ currency
Newbould's 5 50 to £ gold
J. & Riley Carr's 5 50 to £ gold
" " Rasps 5 75 to £ gold
Stubs' 8 50 to £ gold
Butcher's 5 50 to £ gold
Spear & Jackson's 5 50 to £ gold
Hargreaves, Smith & Co.'s 5 00 to £ gold
Jowitt's 5 25 to £ gold
"Western" 5 00 to £ net
W. K. & C. Peace's "Imperial" 5 25 to £ gold
R. Ibbotson 5 00 to £ gold
Beam & Murray, "Cyclops" 4 85 to £ gold
Fisher's 4 75 to £ gold
Goodlad's 4 00 to £ gold
Moss & Gamble 5 25 @ 5 50 to £ gold

Fluting Machines.
Acme $7 00 each net
Cole 5 75 each net
Manville, No. 2 7 00 each net
Knox, with 4-inch Rolls 5 00 each net
" " 6 " " 6 00 each net
O. K. 6 50 each net
Peerless, 4-inch Rolls 4 00 each net
" 5 " " 5 00 each net
Excelsior, No. 1 4 75 each net
" No. 2 6 50 each net
Diamond 7 50 each net
Climax 7-inch Rolls 8 00 each net
" 4½ " 6 50 each net
Empire 4 00 each net
Eureka, No. 1, 7-inch Roll 8 00 each net
" No. 2, 5-inch Roll 6 00 each net
K. F. M., 4-inch Roll 5 50 each net
" 6-inch Roll 6 00 each net
Myers' Fashion Fluter, 4½-inch Rolls 3 00 each net
" Convex Brass Fluter, Sad Iron attachment $1·75
Domestic Fluter $1·75 each net
Fairy, Self-Heater 10 00 each net
National, 5-inch Rolls 5 00 each net
Ponton Fluter, Bright $1 50—dis 25 %
" " Galvanized 2 00—dis 25 %
Geneva Hand Fluter $1 25 each net

Fry Pans.
Tinned dis 20 %
⅌ doz $3·00 3·25 3·62 4·00 4·50 5·00 5·50 6·00 7·50
No. 0 1 2 3 4 5 6 7 8
Peck, Stow & Wilcox dis 25 %
Smith, Burns & Co., "Excelsior" Polished dis 20 %
⅌ doz $3·70 4·00 4·70 5·30 6·00 7·00 8·00 9·00
No. 1 2 3 5 6 7 8

Hammers.
Emmet Hammer Co dis 10 %
Maydole's new list net
Cheney's new list net
Verree dis 5 %
Yerks & Plumb new advanced list dis 5 @ 10 %
Minot & Co dis 15 %

Handles.
Hammer and Hatchet dis 10 %
Quakertown, Axe, Pick and Sledge dis 10 %
" Hammer and Hatchet net
Greensboro', Axe, Pick, Hammer, &c dis 10 %
Woolworth Axe, Pick and Sledge dis 10 %

Harness Snaps.
Judd's dis 30 %
Fitch's dis 30 %

Hatchets.
Isaiah Blood dis 10 %
Shingling, Nos. 1 2 3 ⅌ doz $7 50 8 00 8 50
Claw, " 1 2 3 ⅌ doz 8 50 9 00 9 50
Lathing, " 1 2 3 ⅌ doz 7 50 8 00 8 50
Hunt's net
Shingling, Nos. 1 2 3 ⅌ doz $7 25 8 00 8 75
Claw, " 1 2 3 ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ⅌ doz 7 50 8 25 9 00
Hurd's dis 20 %
Shingling, Nos. 1 2 3 ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ⅌ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s dis 25 %
Shingling, Nos. 1 2 3 ⅌ doz $6 50 7 00 7 50
Claw, " 1 2 3 ⅌ doz 7 25 7 75 8 25
Lathing, " 1 2 3 ⅌ doz 6 50 7 00 7 50
Yerks & Plumb dis 10 %
Shingling, Nos. 1 2 3 ⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3 ⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ⅌ doz 7 00 7 50 8 00
Simmon's dis 10 @ 15 %
Shingling, Nos. 0 1 2 3 ⅌ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3 ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ⅌ doz 8 00 8 50 9 00
Broad, " 1 2 3 ⅌ doz 9 00 10 00 12 00
" " 4 5 6 ⅌ doz 14 00 16 00 18 00
" " 7 8 ⅌ doz 20 00 22 00
Elephant dis 20 %
Shingling, Nos. 1 2 3 ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ⅌ doz 8 00 8 50 9 00
J. P. Verree & Co dis 5 %
Shingling, Nos. 1 2 3 ⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3 ⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ⅌ doz 7 00 7 50 8 00
Underhill's dis 10 %
Shing'ing, Nos. 1 2 3 ⅌ doz 7 25 8 00 8 75
Claw, " 1 2 3 ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 ⅌ doz 11 00 12 00

Hinges.
Wrought Strap and T dis 30&7½ %
Providence Plate { 6 and 8 in. list 11c. } { over 8 in. list 9½c. } dis 10&5 %
Screw Hook and Strap { 8, 10, 12 in. 8½c } { 14 to 36 in. 7½c } net

Hoes.
Solid Shank, C. S. ⅌ doz $8 00—dis 20 @ 25 %
Socket ⅌ doz 9 00—dis 20 @ 25 %
Riveted Eye ⅌ doz 5 00—dis 20 @ 25 %
Grub dis 20 %
Planters'—Winsted add 10 %
Scovill add 33⅓ %
Scovill Pattern (Winsted) add 30 %

Hooks.
Belt dis 30 %
Bench ⅌ doz net $5 00 @ 8 50
Wardrobe, Japanned new list dis 10&10 %
Hat and Coat " new list dis 15&10 %
Wrought Staples and Hooks and Staples dis 60 %
Wrought Hasps and Staples and Hasps, Hooks and Wrought Staples dis 60 %
Screw Hooks and Eyes, revised list dis 65&10 %

Horse Nails.
Putnam's.
No. 5 6 7 8 9 10
32c 29c 26c 25c 24c 23c
In lots 2000 lbs. dis. 5 %.
Ausable
No. 5 6 7 8 9 10
30c 7c 25c 24c 23c 22c
In lots of 1000 lbs. 5 % discount.
Brundage.
No. 5 6 7 8 9 10
29c 26c 24c 23c 22c 21c
In lots of 500 lbs., dis. 5 %.
American Pressed.
No. 5 6 7 8 9 10
22c 20c 20c 20c 20c 20c
In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).
No. 5 6 7 8 9 10
31c 28c 26c 25c 24c 23c
In lots of 1000 lbs. dis 5 %.
Buffalo Forged.
No. 6 7 8 9 10
28c 26c 25c 24c 23c
Globe (Pointed and Polished).
No. 5 6 7 8 9 10
31c 28c 26c 25c 24c 23c
In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished), Extra Finish.
No. 5 6 7 8 9 10
30c 27c 25c 24c 23c 22c
In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).
No. 5 6 7 8 9 10
33c 30c 28c 27c 26c 25c
In lots of 500 lbs., 5 % discount.
" 1000 lbs 7½ % discount.
New London Horse Nails.
No. 6 7 8 9 10
Great Western 27c 25c 24c 23c 22c
U B 29c 27c 26c 25c 24c
In lots of 1000 lbs., dis 5 %.
Star Brand ⅌ ℔ 16c
Morgan 16c

Horse Shoes.
Burden ⅌ keg, $6 37½
Shoenberger ⅌ keg, 6 37½
R. I. Horse Shoe Co., Perkins Pattern ⅌ keg, 6 37½
" " R. I. Pattern ⅌ keg, 6 87½
Mule Shoes ⅌ keg, 7 37½

Kettles.
Enameled dis 15 %
Brass ⅌ ℔ 50c
In lots of 500 ℔s ⅌ ℔ net

Knives.
Ames' Butcher Knives dis 20 %
" Shoe " dis 15 %
Hay and Straw, "Wadsworth's" dis 20 %

Knobs.
Base—Common net
" Plush Tip dis 10 %
" Elastic End reduced list dis 10&10 %
Trenton Lock Co dis 40 %

Lanterns.
Brady's Patent dis 10 %
Ætna dis 10 %
Yankee dis 10 %
De Beque dis 10 %

Locks and Latches.
Cabinet—Eagle dis 25 %
Cabinet—Gaylord dis 25 %
Trunk dis 10 %
Continental dis 15 %
Shepardson's dis 20 %
Trenton Lock Co dis 40 %
Branford dis 40 %
Norwich dis 40 %

Meat Cutters.
Dixon's (P. S. & W.) dis 10 %
No. 1 2 3 4
⅌ doz $14 00 $17 00 $19 00 $30 00
Hales' dis 25 %
No. 11 12 13
⅌ doz $27 00 $33 00 $42 00
Perry's Champion (P. S. & W.) dis 10 %
No. 200 300 400
⅌ doz $22 00 $27 00 $40 00
Woodruff's (P. S. & W.) dis 10 %
No. 100 150
⅌ doz $15 00 $18 00
American dis 25 @ 25&5 %
No. 1 2 2½ 3 4 5
Each $6 00 $9 00 $14 00 $15 00 $30 00 $75 00

Molasses Gates.
Stebbins' Pattern dis 60&10 %
Tinned ends dis 40&10 %
Weed's Patent Self-Boring dis 15 %
" without Auger Bit dis 40 @ 50 %
Patent Self-Measuring per doz $42 00—dis 20 %

Mouse Traps.
Wood Choker ⅌ doz holes, 16 @ 20c

Nails.
10d Cut (Standard) $4 75

Nuts and Washers.
Nuts large, 4c ; small, 5c off list.
Washers large, 5c ; small, 7c off list

Oil Stones.
Washita No. 1 ⅌ ℔ 22c
" Slips ⅌ ℔ 44c
Hindostan ⅌ ℔ 6c dis 10 %
" Slips ⅌ ℔ 10c dis 10 %

Oilers.
Olmsted's dis 25&10 %
Broughton's dis 25&5 %
Common Zinc, Brass and Copper dis 25 %

Picks.
Washoe R. R. Nos. 1 2 3 4 5
⅌ doz $14·00 15·00 16·00 17·00 18·00
Washoe Coal, " $8·50 9·00 10·00 11·00 13·00 15·00

Picture Nails and Knobs.
Richards' Patent dis 40 @ 40&10 %

Planes.
Sandusky Tool Co., 1st quality dis 20 %
" " 2d " (Ogontz) dis 20&10 %
Ohio Tool Co., 1st quality dis 20 %
" " 2d quality (Sciota) dis 20&10 %
Owasco Tool Co., 1st quality dis 25 %
" " 2d quality dis 25&10 %
Plane Irons list net
" Butcher's $5 50 to £ gold—new list
" Spear & Jackson's 5 50 to £ gold—new list
" Sandusky Tool Co list net

Plumbs and Levels
Standard Rule Co.'s New Adjustable dis 50&10 %

Pumps.
Douglas Cistern, etc new list dis 25 %
" S. & F. new list dis 20 %

Rakes.
Cast Steel dis 25 %
$8 00 9 00 10 00 11 00
8 10 12 14 teeth.

Razor Straps.
Genuine Emerson dis 25 %
" " in 5 gross lots dis 30 %
Hunt's dis 25&10 %
Chapman dis 10 @ 15 %

Rivets.
Iron and Tinned dis 25 %
Copper Rivets and Burrs dis 10 %

Rods.
Stair new list dis 25 %
American Patent dis 25 %

Rope. Manufacturers' List
Manila ⅜ inch and larger ⅌ ℔ 18 c
" 5/16 inch ⅌ ℔ 18½c
" ¼ and 5-16 inch ⅌ ℔ 19 c
" Lath Yarn ⅌ ℔ 19 c
" Hay Rope ⅌ ℔ 18½c
Sisal ⅜ inch and larger ⅌ ℔ 16 c
" 5/16 inch ⅌ ℔ 16½c
" ¼ and 5-16 inch ⅌ ℔ 17 c
" Hay Rope ⅌ ℔ 16½c

Rules.
Hubbard & Curtiss Mfg. Co new list net
Stanley Rule and Level Co.'s Ivory dis 50&10 %
" " " Boxwood dis 60&10 %
Standard Rule Co.'s Boxwood dis 60&10 %
" " " Ivory dis 50&10 %

Sad Irons.
⅌ ℔ 4¾c net
Sad Iron, Nickel Stand attached ⅌ ℔ 9c

Sand Paper—dis 7½ @ 10 %
Beader & Adamson's (Flint) 00 to 1½ $4 50 ⅌ ream
" " " 2, 2½ & 3 5 00 "
Assorted 4 50 "
Star ⅌ ream $8 50
Emery ⅌ ream $7 00 @ 12 00
Cowdin Mfg. Co dis 7½ @ 10 %
Diamond Flint, 00 to 1½ per ream $4 50
" " 2, 2½, 3 and assorted " 5 00
" Emery Paper per ream $7 00 to 12 00

Sash Locks.
Clark's dis 20 %
Ferguson's dis 20 @ 25 %
Champion ⅌ gross $13 00 @ $15 00
Norwich dis 15 %

Sash Weights.
Solid Eyes ⅌ ℔ 3¼c

Sausage Fillers.
Perry's (P. S. & W.) dis 10 %
No. 1 0
⅌ doz $15 00 $21 00

Saw Rods.
dis 10 %

Saws.
Spear & Jackson's $4 50 to £ gold
John Spear $3 60 to £ gold
Am. Saw Co new list
Perforated Cross Cuts, all kinds 68c ⅌ foot
Inserted Tooth dis 10 %
All else dis 12½ %
Disston's dis 12½ %
H. W. Peace's Circulars dis 10 %
Other kinds dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular new list dis 10 %
E. M. Boynton's Lightning dis 30 %
" " Others dis 10 %

Scales.
Brown's dis 25&5 %
Fairbanks' new list dis 15 @ 20 %
Howe's dis 15&5 %
Shattuck's Counter and Union dis 15 %
National Platform dis 25 %
Eureka dis 25 %
Scale Beams dis 20 %
No. 1 300 to 1200 lbs 90c ⅌ cwt
No. 2 " " 75c ⅌ cwt

Screws.
American list of April 1, 1873.
Flat Head Iron dis 47½ %
Round Head Iron dis 45 %
Flat Head Brass dis 60 %
Round Head Brass dis 50 %
Round Head Silver Capped new list dis 20 %
Hand Rail dis 10 %
Coach or Lag dis 25 %
Coach, Patent Gimlet Point dis 5 %
Bed list net

Scythes.
Blood's German Steel, Grass ⅌ doz $9 00
" Cast " " ⅌ doz 10 00
" Silver " " ⅌ doz 11 00
" German " Grain ⅌ doz 13 00
" Cast " " ⅌ doz 14 00
" Red Rover 12 00
" Young America 9 50
" Silver Clipper 12 63
Scythe Snaths dis 20 %

Shears.
Cast Steel dis 60&10 %
Conn. Cutlery Co., new brand dis 60 %
Rowe's dis 50&10 %

Shovels and Spades.
Ames new list dis 10 %
Rowland new list Feb. 8, '73, dis 20 %
Old Colony dis 2½ %

Shovels and Tongs.
Iron Head list net
Brass Head dis 5 %
Polished Steel new list dis 15 %

Slates.
Square Frames, Round Cornered, by case dis 60&10 %
Less than a case dis 50 @ 55 %
Oval Frames, by case dis 40 @ 40&10 %
Less than a case dis 30 %

Spoons.
Iron new advanced list, dis 10 %
By the case dis 20 %
Britannia dis 40 %
Plated A 1 revised list dis 30&5 %
German Silver revised list dis 15&5 %
Tinned (P. S. & W.)—
Teas $1·50 ⅌ gross, net
Tables 2·75 " net

Stocks and Dies.
dis 15 %

Stove Polish.
Joseph Dixon's ⅌ gross, $6 00 @ 6 25
National ⅌ gross $4 75
Gold Medal ⅌ gross $6 00, dis 15 %
Gem ⅌ gross $5 00, dis 10 %

Squares.
Steel dis 50 % ; full cases, dis 50&10 %
Iron dis 50 % ; full cases, dis 50&10 %
Nickel Plated add $2 50 @ $4 00 ⅌ doz net
Try Squares and T Bevels dis 45&10 %
Star Try Squares and Bevels dis 30 %

Tacks.
Full Weight American Iron dis 35&7½ %
Half Weight American Iron dis 67½&7½ %
Carpet dis 7½ %
Brads American Half Weight dis 50&7½ %
Finishing Nails ⅜ ½ ¾ 1 1¼ in. and over
⅌ ℔ 25c 20c 18c 14c 13c dis 7½ %
Trunk and Clout ⅜ ½ ¾ 1 1¼ in. and over
⅌ ℔ 25c 20c 18c 14c 13c dis 7½ %
Copper Tacks ⅌ ℔ 56c—dis 7½ %
Iron Shoe Nails, ⅌ ℔ 4-8 and longer, 10½c ; 3½-8, 11c dis 7½ %
Double Pointed new list dis 33⅓ %

Tapes, Measuring.
American Flask and Cap Co dis 10&10 %
Eddy's dis 10&10 %

Toe Calks.
⅌ ℔ 12c net

Tobacco Cutters.
Champion dis 20 %
Peck, Stow & Wilcox dis 10 %

Tinners' Tools and Machines.
P. S. & W list net

Traps.
Newhouse dis 20 %
Hotchkiss dis 20 %
Peck, Stow & Wilcox dis 30 %
Blake's Patent dis 15 @ 20 %

Vises.
Trenton Vises, Solid Box.
30 to 110 lbs 17c
111 to 160 lbs 18c
160 and over 21½c
Peter Wright's ⅌ ℔ 15½c. gold
Wilson's Solid Box dis 10 @ 15 %
39 to 160 lbs 18c
160 and upward 21c
Backus & Union, Parallel dis 25 %
Buffalo, Parallel new list dis 15 %
Fisher & Norris' Double Screw Parallel dis 15 @ 15&5 %

Wire.
Bright and Annealed Nos 0 @ 18 dis 30 @ 35 %
" " " 19 @ 26 dis 40 @ 45 %
" " " 27 @ 36 dis 45 @ 50 %
Coppered Nos. 0 @ 18 dis 22½ @ 27½ %
Galvanized, Nos. 0 to 12 dis 35 @ 40 %
Galvanized, Nos. 13 to 18 dis 40 @ 45
Tinned dis 15 @ 30 %
Cast Steel 5 @ 10 %
Tinned Broom Wire dis 20 @ 25 %
Galvanized Telegraph, Nos. 8 and 9 ⅌ ℔ 10c @ 11c
" " " 10 and 11 ⅌ ℔ 11c @ 12c
" " " 12 ⅌ ℔ 11½c @ 12½c
Annealed Fence, Nos. 8 and 9 dis 30 @ 35 %
" Grape, " 10 to 14 dis 30 @ 35 %
Fence Staples ⅌ ℔ 9 @ 9½ %
Stubs' Steel Wire $7 00 to ℔ gold

Wrenches.
American Adjustable dis 45 %
Baxter's Adjustable "S" dis 20 %
" Diagonal dis 20 %
Collins & Co.'s new dis list 30 %
Coes Genuine dis 40 %
" Pattern (Wrought) dis 50 %
" " (Malleable) dis 50&10 %
Lindsay's Patent dis 25 %
Taft's Patent Screw dis 65&10 %
Davis' Patent Duplex new list dis 25 %

TIN WARE.

STAMPED TIN WARE.

Basins.
Wash Basins, Handled, Plain Stamped dis 20 %
Inch 10 11 11½
Per doz $3·50 4·00 4·50
Wash Basins, Handled, Retinned dis 25 %
Inch 10 11 11½
Per doz $4·00 4·50 5·00
Wash Basins, with Feet, Plain Stamped dis 20 %
Inch 10 11 11½ 13½
Per doz $2·00 2·50 2·85 3·75
Wash Basins, with Feet, Retinned dis 25 %
Inch 10 11 11½ 13½
Per doz $3·00 3·50 4·00 5·00
Wash Basins, Stamped dis 20 %
Inch 10 10½ 11½
Per doz $1·70 2·10 2·50
Inch Shallow 10 11
Per doz $1·55 1·90
Wash Basins, Retinned dis 25 %
Inch 10 10½ 11½
Per doz $2·50 3·00 3·50
Inch Shallow 10 11
Per doz $2·00 2·60

Covers.
Bucket net
1 pt 1 qt. 2 3 4 6 10 12 qt.
Per gross $1·75 2·15 3·20 3·60 4·40 5·50 7·00 10·75
Coffee Pot net
8 pt. 2 qt. 3 4 6 qt.
Per gross $ ·95 1·10 1·40 1·80 2·25
Pot net
Inch 7½ 7¾ 8½ 8¾ 9½ 9¾ 10½
Per gross $4·10 4·50 5·15 5·65 6·25 6·60 8·25
Inch 10¾ 11½ 11¾ 12½ 12¾ 13½
Per gross $8·85 9·60 10·20 12·25 13·50 15·00
Tea Kettle Breasts and Covers net
Inch 6 6½ 7 7½ 8 8½ 9
Per gross $5·00 5·25 5·60 6·15 6·75 7·50 8·30
Inch 9½ 10 10½ 11 11½ 12 13
Per gross $8·85 11·50 12·00 12·25 13·00 17·00 18·00
Stove Pipe Collars, Tin net
Inch 4 4½ 5 5½ 6 7
Per gross $3·40 3·65 4·40 4·80 5·35 6·35
Dipper Bowls, Plain Stamped dis 25 %
Pints ½ ¾ 1 1½ Quarts 1 2 2½
Per doz ·50 ·60 ·70 ·80 Per doz ·90 1·25 1·50
Dipper Bowls, Retinned dis 25 %
Pints ½ ¾ 1 1½ Quarts 1 2 2½
Per doz ·75 ·95 1·00 1·15 Per doz 1·30 1·55 1·50

Pans.
Dish Pans, Tinned dis 30 %
Quarts 7 8 10 14 17 21 30
Per doz 8·50 9·50 11·00 13·00 16·00 19·00 30·00
Milk Pans, Plain Stamped dis 20 %
Quarts ½ 1 1½ 2 3 4 5 6 8 10
Per doz $ ·85 1·05 1·20 1·45 1·65 2·40 2·90 3·15 4·40 5·00
Milk Pans, Retinned dis 25 %
Quarts ½ 1 1½ 2 3 4 5 6 8 10
Per doz $1·15 1·40 1·60 1·90 2·15 3·00 3·40 3·80 5·20 6·00
Pie Plates, Deep net
Inch 6 7 8 9 10 11 9 10
Per gross $3·40 4·25 5·50 6·00 8·50 10·00 7·25 9·25

JAPANNED TIN WARE.

Cannisters, Common net
Pound ½ 1 2 3
Per doz $ ·75 1·20 1·70 2·20
Cannisters, Hinged net
Pound 1 1½ 2 3 4 6
Per doz $1·35 1·75 2·20 2·60 3·00 3·50
Candlesticks, Japanned net
No 1 2
Per gross $6·00 5·50
Cake Boxes, Round net, per nest, $2·40
" Square net, per nest, 3·40
Dust Pans, Corrugated net, per gross, $18·00
Grates, Box net, per gross $3·20
Molasses Cups net
Pint ½ 1 2
Per gross $10·40 12·80 24·00
Pepper Boxes Japanned net
Per gross Small, $2·50 ; Large, $3·20
Toy Banks, House net
No 1 2
Per gross $6·00 4·25
Toy Banks, Gothic net
No 1 2
Per gross $5·25 3·25
Toy Cups, Straight net
No 1 2 3
Per gross $3·40 2·80 2·40
Toy Cups, Flaring net
No 1 2
Per gross $6·60 3·20
Toy Pails, Covered net
No 1 2
Per gross $3·25 2·85
Toy Rattles net, per gross, $1·75
Trunks, Wire Handled net, per nest (5) $1·25
Spittoons, Tin net, per gross $22·00

PLANISHED TIN WARE.

Planished Coffee Pots, Round dis 20 %
Each ·60 ·75 ·85 ·95 1·15 1·25 1·30 1·40
Pints 1 2 3 4 5 6 7 8
Planished Tea Pots, Round dis 20 %
Each ·70 ·80 ·95 1·05 1·25
Pints 2 3 4 5 6
Planished Tea Pots, Oval dis 20 %
Each ·70 ·80 ·90 1·05 1·15 1·40 1·75
Pints 1 2 3 4 5 6 8

METALS.

IRON.—DUTY : Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1½ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton ; Polished Sheets, 3 cents per lb. ; Wrought Scrap, $8 per ton ; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1 ⅌ ton, $40 00 @
Foundry No. 2 " 32 00 @ 33 00
Gray Forge " 28 00 @ 29 00
White and Mottled "
SCOTCH.
Gartsherrie " 48 00
Coltness " 45 00
Glengarnock " 41 00 @
Eglinton " 40 00 @

Bar Iron.
Am. Refined, at mill ⅌ ℔ 3·5 @ 3·8

Rails.
Welsh, gold ⅌ ton, 62 00 @
American, at works, currency " 70 00 @
Old Rails, currency " 45 00 @ 46 00

Scrap.
Wrought Scrap, from yard " 40 00 @
" " from dock " 37 00

Bar Iron from Store.
Common Iron.
⅜ to 2 in. round and square ⅌ ton, $ 77 50
⅝x9-16 in " " " 82 50
½ in. " 85 00
2¼ to 3 in. " " 82 50
1 to 6 in. wide x ⅜ and 1 in. thick " 77 50
1½ to 6 in wide x ¼ & 5-16 in. thick " 82 50
1 and 1¼ in. x ¼ and 5-16 " 90 00
Swedish Iron.
1½x⅜ and ½ " 182 50
1½x⅜ to ⅝, and ⅝ square " 177 50
1⅜ to 5x⅜ to ⅝ and ⅜ to 2-in. square " 172 50
6 to 8x⅜ and ½ " 182 50
Refined Iron.
⅝ to 2 in. round and square " 82 50
1 to 6 in. wide x ⅜ to 1 thick " 82 50
1½ to 6 in wide x ¼ and 5-16 thick " 87 50
1 and 1¼ x ¼ and 5-16 " 92 50
Large Rounds.
2¼ to 2¾, round and square " 92 50
3, 3¼ and 3½ in " 97 50
3¾ and 4 in " 107 50
Rods—⅝ and 11-16, round and square " 87 50
½ and 9-16 " " " 92 50
7-16, " " " 95 00
⅜, " " " 100 00
5-16, " " " 105 00
¼, " " " 110 00
3-16, " " " 135 00
Band Iron.
1 to 6 in. x 3-16 to No. 12 " 102 50
Horse Shoe Iron.
⅜ and ⅝ x ⅜, to ½ " } 120 00
1 x ⅜, to ⅝ " }
Ovals, Half Ovals and Half Rounds.
⅝ to 1½ ⅌ ton, $107 50
⅝ and 11-16 " 112 50
½ and 9-16 " 117 50
7-16 "
⅜ "
Nail Rods
Best Norway ⅌ ℔ 9c
Norway Shapes
⅜ to 2 in. x ½ to ⅝ " } 8¾c
⅜ to ¾ square " }
Norway Bar
⅜ to 2 in. square
Spring Steel
1 to 4 in. wide " 8¼c
Tire Steel
⅝ to 1½ x ½ and 5-16 " 8¾c
¾ & 1 x 3-16 " } 9¾c
⅝ & 1 x ⅜ " }
Toe Calk Steel
½ to ¾ x ⅜ to ½ " 8¼c
Plow Steel
6 to 16 wide " 9¼c
Sleigh Shoe Steel
⅝ to 1½ x ⅜ to ⅝
Hoops, ⅝ x No. 22 ⅌ ton, $165 00
" ¾ x No. 20 " 150 00
" ⅞ x No. 19 " 145 00
" 1 and 1⅛ x No. 18 " 127 50
" 1¼ to 2 and 1x1⅛ x No. 13 and 14 " 117 50
Scroll Iron—½ x 12 " 136 00
" ½ x 10 " 135 00
" ½ x 3-16 " 130 00
" ½ x ¼ " 125 00
" ⅝ x 14 " 135 00
" ⅝ x 12 " 122 50
" ⅝ x 10 " 120 00
" ⅝ x 3-16 " 117 50
" ⅝ x ¼ " 115 00
" ¾ x 12 " 117 50
" ¾ x 10 " 115 00
" ¾ x 3-16 " 112 50
" ¾ x ¼ " 110 00
" ¾ x 14 "
" ⅞ x 12 " 112 50
" ⅞ x 10 " 110 00
" ⅞ x 3-16 " 107 50
" ⅞ x ¼ " 105 00
" ⅞ x 14 " 122 50

Sheet Iron.

		Common English.	R. G. American.
Nos. 10 to 20	⅌ ℔	5¾c	7c
21 to 24	"	6¼c	7½c
25 to 26	"	6½c	7½c
27	"	7c	7¾c
28	"	7¼c	8c
30	"	8c	

Galvanized, 10 to 20, prime ⅌ ℔ 11c
" 21 to 24 " 12c
" 25 to 26 " 13c
" 27 " 14c
Patent Polished " 15c
Russia, Nos. 8 to 11 ⅌ ℔ 21c
" Nos. 12 to 16 " 20c
" Stained, No. 1 " 19c
Belgian "
One piece Corrugated Sheet Iron Elbows.
CHARCOAL IRON
4½ 5 5½ 6 7 in
$3·75 4·25 5·25 5·25 6·50 p
RUSSIA IRON.
4½ 5 5½ 6 7 in
$8·00 10·00 13·00 13·00 14·00 do
Adjustable Stove Pipe Elbows.
CHARCOAL IRON.
4 4½ 5 5½ 6 7 inch
$3·25 3·75 4·25 4·75 5·25 6·25 per d
RUSSIA IRON.
4 4½ 5 5½ 6 7 inch.
$7.00 8·00 9·50 10·75 11·75 13·75 per doz.
Discount on orders of 10 doz. 5 %.
" " " " 25 " 10 %.

Brass.
ROLLED AND IN SHEETS.
(Brown & Sharp's Gauge.*)
For the purchase of 100 pounds and over at one time :
HIGH BRASS.
All Nos. to No. 28, and widths 14 in. and under 40c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive 43c
Over 20 in. to 30 in. inclusive 46c
½c ⅌ ℔ advance on each No. above No. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass at 59c
Sheets 24x48 in., and all sheets cut to particular sizes and lengths 46c
Printers' Rules 50c
Sheets wider than 30 in. and under 40 in 50c
" 40 in. and over 52c
Circular sheets, in diam. from 4 in. to 14 inclusive 50c
" " " over 14 in. to 20 " 53c
" " " " 20 in. to 30 " 56c
" " " " 30 in. to 40 " 59c
" " " " 40 in 62c
LOW BRASS.
4c ⅌ ℔ more than High Brass.
Gilding Metals, 7c ⅌ ℔ more than High Brass.
Platers' or Gold Metal { In Bars 52c { Sawed 55c
FOR SLITTING : Metal in Width.
2 in. to ½ in., to No. 30, inclusive, 1c ⅌ ℔ advance.
2 in. to 1 in., thinner than No. 30, 2c ⅌ ℔ advance.
2 in. to ½ in., " " 30, 3c " "
½ in. and less to No. 30, 2c ⅌ ℔ advance.
½ in. and less thinner than No. 30, 5c ⅌ ℔ advance.
10 % discount.
SCRAP—NEW METAL.
High Brass Scrap, 19 cents, net.
Low " 21 " "
Gilding, 23 cents, net.
Turnings, Filings and Chips, half the price of Scrap net.
BRASS AND COPPER WIRE.
(Stub's Wire Gauge).

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	43	47	54
Nos. 21, 22, 23	44	48	54
Nos. 24 and 25	45	49	55

Brass Wire straightened and cut, 4 cents advance
10 % discount.

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 26	0·45	0·49	0·55
No. 27	0·48	0·52	0·58
No. 28	0·50	0·54	0·60
No. 29	0·52	0·56	0·62
No. 30	0·54	0·58	0·66
No. 31	0·56	0·60	0·70
No. 32	0·60	0·64	0·75
No. 33	0·64	0·68	0·85
No. 34	0·68	0·72	0·95
No. 35	0·73	0·77	1·07
No. 36	0·82	0·86	1·19
No. 37	1·03	1·02	1·32
No. 38	1·32	1·32	1·62

Ten cents per pound extra for Spooling.

TUBING.

(Brown & Sharpe's Gauge.)

	₱ ft
Plain to No. 20, inclusive	$0 58
Nos. 21, 22, 23, 2c. advance on List for each No.	
Nos. 24, 25, 26, 4c. " " "	
Above No. 26 special rates.	
Plain Tube, 1-4 inch	74
" 3-16 "	1 59
" 1-8 "	1 81

All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20.
Tubing sawed or cut 2 to 4 ft. long, 2c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet. 10 % discount.
BRASS DOOR RAIL Polished—54 cents per lb.—10 % discount.

BELT AND HOSE COPPER RIVETS AND BURS.

Price per ₱	57	58	60	62	64	66	68	72	76
Nos.	7	8	9	10	11	12	13	14	15

Braziers Rivets, 51 cents per pound discount 10 %.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent. 12 inch. to No. 26	1·00	1·15
6 " " "	1·10	1·25
10 " " "	1·25	1·45
15 " " "	1·35	1·60
18 " " "	1·45	1·75
20 " " "	1·55	

Discount 10 %.
German Silver Sheets over 12 inches wide and weighing more than 10 lbs. $2·25 ₱ lb net
Advance two cents for each additional inch in width above 12 inches, and two cents per pound on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers' at 50 cents per pound additional.
German Silver Scrap, one-third less than net price of 12 inch Market Metal; German Silver Turnings, Fillings and Chips, half the price of Scrap.
* Brown & Sharp's Gauge is about two numbers finer than Stubs' Wire Gauge.

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper 4 cents ₱ lb; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.

American Ingot	₱ lb 26 @ 26¼c
English "	" "

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.

Braziers Copper, ordinary sizes, over 16 oz., per square foot	40c ₱ ft
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot	43c. "
Braziers' Copper, 12 oz. per square foot and lighter	46c. "
Circles less than 24 inch in diameter	43c. "
Circles, 8 4 inch diameter and over	46c. "
Segment and Pattern Sheets	43c. "
Locomotive Fire Box Sheets	40c. "
Sheathing Copper, over 12 oz. per sq. ft.	38c. "
" " 12 oz. ₱ sq. ft. and lighter	46c. "
Bolt Copper	40c. "

No Copper in Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case	8c. ₱ sheet
14x48, less than case	10c. "
Boiler Sizes, 7 and 8 inch	12c. "
" 9 inch	15c. "
Other sizes not larger than 30x60	2½c. ₱ sq.
Larger than 30x60	5c. "
Copper Bottoms, 40c. ₱ lb	dis 5 %

O'NEILL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier	44c. By the case, 43c. ₱ lb
12 oz. and lighter	47c. " " 46c. "

Boiler Sizes.

7 in., 14x52. 8 in., 4x56. 9 in., 14x60

14 and 16 oz. and heavier	46c. By the case, 45c. ₱ lb

(And all sizes not over 20 inches wide.)

30x60

14 and 16 oz. and heavier	53c. ₱ lb
12 oz.	51c. "

LEAD—DUTY: Pig, $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb. All subject to a reduction of 10 per cent.

Spanish	6¾ @ 6¾c gold
German Refined	6¾ @ 6¾c gold
English	@ 7¼c gold
Bar	dis 10 % 9¾c.
Pipe	dis 10 % 10¼c.
Tin Lined Pipe	dis 10 % 16¼c.
Sheet	dis 10 % 10½c.
Shot	dis 10 %. Drop, 11¼c.; Buck, 12¾c.
Solder No. 1, 20c. @ 21c. No. 2, 19c. @ 20c.	

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3¼ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool	17c
Spring	18½c
Homogeneous	18¾c
Tire	12½ @ 18½c
Machinery (round and square)	11½ @ 12c
File	13½c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut circular as to size	13 @ 14c 18 @ 30c

Chrome Steel.

Tool	₱ lb 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₱ lb 13c and upward
Machinery	₱ lb 14c.
Hammer	" 15c.
Gun or Homogeneous	" 16c.

English Steel,—payable in gold, dis 5 % cash.

Best Cast	₱ lb 19½c
Extra Cast	" 20½c
Round Machinery, Cast	" 12½c
Swaged, Cast	" 21½c
Best Double Shear	" 19½c
Blister, 1st quality	" 15½c
" 2d quality	" 13½c
" 3d quality	" 11¾c
German Steel, Best	" 12½c
do Eagle	" 11¾c
do 3d quality	" 10½c
Sheet Cast Steel, 1st quality	" 19½c
" " 2d quality	" 17¼c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash	7¼ @ 7¾c., gold
American "	8 @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per lb.; Manufactures of, not enumerated, 35 per cent. ad val.—all subject to a reduction of 10 per cent. Bars, Banca or Block, and Pigs, free.

Banca	₱ lb 34c., gold
Straits	₱ lb 31c., gold
English	₱ lb 29c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal	12·00
12x12, "	12·50
14x20, "	12·75
I X 10x14, "	14·25
12x12, "	14·75
14x20, "	15·25
For each additional X add	2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary
I C 10x14	$11·50	$10·50	9·00 @ $10·00
I C 12x12	12·00	11·00	
I C 14x20	12·00	11·00	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$11·50	11·00	8·50 @ 10·50
I X 14x20	13·75		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet, 2½c. ₱ lb. All subject to a reduction of 10 per cent.

Sheet	cask 10c
"	open 10½c

Paper Stock, Old Metals, &c.

(*Dealers' Selling Prices.*)

Canvas linen	6 @ 6¼
" cotton, No. 1	7 @ 7¼
" " No. 2	4
White linen rags, No. 1	6¾ @ 7
" " No. 2	4¾ @ 5
Colored	3 @ 3½
Mixed woolens	4 @ 5
Soft woolens	6¾ @ 7
Gunny bagging	1¾ @ 1¾
Jute Butts	1¾ @ 2
Kentucky bagging	3½ @ 3¾
Book stock	4½ @ 4¾
Waste paper and scraps	2½ @ 3
Rope cuttings	1¾ @ 2
Kentucky Bale rope	4 @ 4¼
Oakum junk, No. 1	6
" No. 2	4¼ @ 4¾
Grass rope	4 @ 4¾
Tarred Shaking	1¾ @ 2

Old Metal.

Copper	24 @ 25
Yellow metal	18 @
Brass	18 @ 20
Heavy Composition	21 @ 23
Old lead, solid	6½ @ 7
Tea lead	5¼
Wrought iron	1¾ @ 1¾
Sheet Iron	1 @
Cast iron	1 @ 1¼
Machinery iron	1¼ @ 1¾
Zinc	6
Pewter, No. 1	26 @ 27
" No. 2	10 @ 12
Spelter	7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₱ lb 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	26c
Black Paint, in oil	kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best	50 @ 75c
" " in oil	55 @ 65c
" Chinese, dry	85c
" Ultamarine	25 @ 30c
Brown, Spanish	1¼c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Chrome	15 @ 23c
" " in oil	18 @ 25c
" Paris	good, 30c; best, 40c
" " in oil	" 30c; " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14½c
Red Lead, American	9¾c
" " English	10½c
" Venetian (N. C.) dry	2¾c
" " in oil	asst'd cans, 11c; kegs, 8¾c
" Indian, dry	10c
Rose Pink	18c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 26c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	$1 45
" English	1 40
" Trieste	1 38
" American, Common	28c
White Lead, American, pure dry	11 c
" " " in oil	11½c
White, Paris, English, prime	in bbls. 2¾ @ 2¾c
Yellow Ochre French	2¾ @ 2¾c
" " in oil	asst'd cans, 11c; kegs, 8¼c
" Vermont	in casks 1½c
Chrome	17 @ 21c
" in oil	18 @ 26c
Zinc White, American No. 1 dry	8c
" 1, in oil	11c
" French (Paris)	11 c
" " in oil	12 c

Oils.

Linseed Raw	₱ gal. casks, 97c. bbls. 98c.
" Boiled	" $1·02 " $1·03
Whale, Crude	"
" Bleached Winter	"
Sperm, Crude	"
" Winter unbleached	"
" " Bleached	" 1·80
Seal, Extra Refined	" 87½c
Lard, Pure Winter	" 88c
" Spring	" 76c
Cotton Seed, Crude	" 55c
" Southern Yellow	" 65c
" White	" 75c
Neatsfoot, Winter	$1·10 @ $1·35
Natural Lubricating	bbls, 45c

Sundries.

Asphaltum	9c
Benzine	₱ gal. 16c
Chalk	1½c
" Block	
Dryer, Patent, Am'n	asst'd cans, 10½c.; kegs, 9c
" " English	" 11c.; " 9c
Flocks	
Frostings	50c
Glue, White	38 @ 47c
" Sheet	30c
Glaziers' Points, Zinc	9c
Gum, Copal	38c
" Dainar	25c
" Shellac, English	66c
" " dark	46c
Litmarge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	42c
Whiting, Spanish	1½c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$8·00	$7·00	$6·75	$6·00
8 x 10 to 10 x 14	8·50	8·00	7·25	6·50
10 x 15 to 12 x 16	9·00	8·50	8·00	6·75
13 x 16 to 16 x 20	9·50	9·00	8·50	7·75
15 x 22 to 15 x 30	11·75	10·50	10·00	8·00
16 x 30 to 22 x 30	14·25	12·25	11·00	9·50
15 x 38 to 22 x 36	15·00	13·50	12·00	
24 x 36 to 24 x 40	15·75	14·25	12·50	
28 x 38 to 28 x 42	16·25	14·75	13·25	
28 x 44 to 28 x 50	17·25	15·75	14·25	
30 x 50 to 30 x 54	20·50	17·00	15·50	
32 x 54 to 34 x 56	21·50	19·25	17·50	
34 x 58 to 34 x 60	23·00	21·50	20·25	
36 x 60 to 40 x 60	26·50	24·25	23·00	

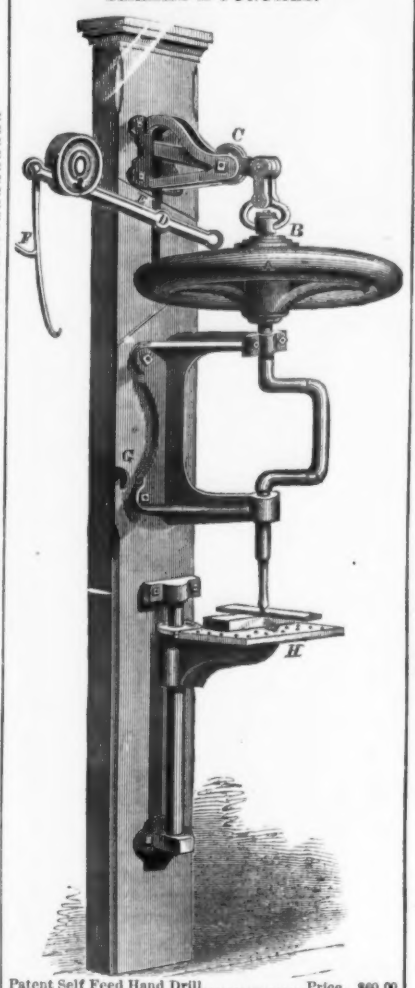
DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$13·00	$12·00	$11·50	$10·00
8 x 10 to 10 x 14	14·00	12·75	12·00	10·75
10 x 15 to 12 x 16	15·00	14·00	13·25	11·25
13 x 16 to 16 x 20	16·00	15·00	14·00	12·50
15 x 22 to 15 x 30	20·00	17·50	16·50	13·25
16 x 30 to 22 x 30	22·00	19·25	17·75	15·00
15 x 38 to 22 x 36	28·75	30·50	19·25	
24 x 36 to 24 x 40	24·75	22·50	20·00	
28 x 38 to 28 x 42	26·00	23·50	21·00	
28 x 44 to 28 x 50	27·50	25·50	22·50	
30 x 50 to 30 x 54	31·00	28·50	24·00	
32 x 54 to 34 x 56	32·50	29·00	26·50	
34 x 58 to 34 x 60	34·50	33·00	31·00	
36 x 60 to 40 x 60	39·50	36·50	35·00	

Sizes above—$12·00 per box extra for every 5 inches. Discount to the trade 50 to 50&10 per cent.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.

Hardware.

BIDDLE MFG. CO.,
102 Chambers Street, N. Y.,
Fine Tools & Hardware Specialties
IMPROVED DRILL PRESSES, SHEARS & PUNCHES.



Patent Self Feed Hand Drill.....Price, $60 00
Patent Self Feed Power Drill, Single Speed, Counter Shaft and Pulleys complete.....Price, 85 00
Patent Self Feed Power Drill, Three Speeds, Counter Shaft and Pulleys complete.....Price, 150 00
Send for Illustrated Catalogue and Price List.
Sole agents for the Pacific Coast,
Conroy, O'Connor & Co., SAN FRANCISCO, CAL.

THE
Peck, Stow & Wilcox Co.,
MANUFACTURERS OF
TINNERS'
Tools and Machines,
AND
GENERAL HARDWARE
97 Chambers Street, New York.

FRANKLIN S. MILES,
Manufacturer of
Brass, Iron, Steel and German Silver
SCREWS.
205 Quarry Street, Philadelphia.

A. C. Downing & Comp'y,
Importers of and Dealers in
Window Glass,
FRENCH PICTURE
And Car Glass, etc.
Estimates given by mail.
57 Beekman & 87 Ann Sts
NEW YORK.

Houston's Pat. Turbine Water Wheel.
Simplest, Strongest, Cheapest, Best.

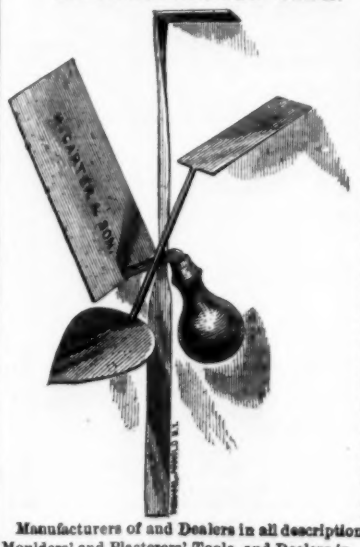
In the test at Holyoke, in 1872, the Houston gave the **highest percentage ever shown** in a reliable test, and the **highest average results ever obtained.** In practical use it is everywhere demonstrating its superiority over all others. Emerson's full report furnished on application.
Send for Circular.
MERRILL & HOUSTON IRON WORKS
Beloit, Wis.

The American Turbine Water Wheel
Recently improved, and submitted to thorough scientific tests, by James Emerson, showing the following useful effect of the power of the water utilized, being the highest results ever known.

PERCENTAGE OF PART GATE.					Per cent. of whole Gate.
¼	½	¾	¼	⅛	
50·08	69·64	78·73	82 53	82·90	83·14

A full report may be obtained of
STOUT, MILLS & TEMPLE, Dayton, O.

H. CARTER,
290 PEARL ST., NEW YORK.

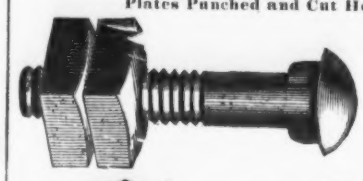


Moulders' and Plasterers' Tools.
Manufacturers of and Dealers in all descriptions of Moulders' and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes, CARTERS' PATENT CARRIAGE LIFTING JACK, &c.

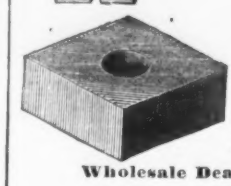
Hardware.

PRATT & CO.,
BUFFALO IRON and NAIL WORKS, Buffalo, N. Y.
Branch Office, 55 Chambers Street, New York.
Manufacture Bar, Angle, and Plate Iron, Spikes and Nails, Railroad Fish Plates, Bolt and Spikes, Railroad and Contractors' Supplies in general, Belt Blanks, Conch Screws "Adams Nut Lock."

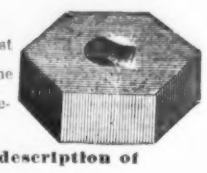
Plates Punched and Cut Hot. Bolts and Spikes, Superior Stock



COLD PUNCHED NUTS.



All sizes constantly on hand. We use the best Lake Superior Iron, and make a uniform handsome nut. Orders solicited. We make washers a specialty. Also



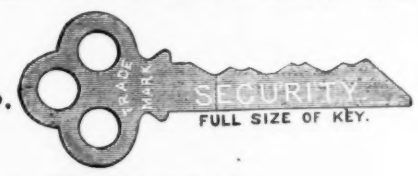
Wholesale Dealers in and Manufacturers of every description of
HEAVY AND SHELF
HARDWARE.
PRATT & CO., Buffalo, N. Y.

GEORGE B. WALBRIDGE,
Manufacturers' Agent,
55 Chambers St., New York, Represents:

National Horse Nail Company, POLISHED AND POINTED NAILS.	Shoenberger's HAMMERED HORSE SHOES.	PRATT & CO., BUFFALO HORSE NAILS, NUTS, WASHERS, Crow Bars, &c.
SHELTON CO., BED SCREWS, CARRIAGE BOLTS, TACKS, &c.	WOOLWORTH HANDLE WORKS, *Axe, Pick and Sledge HANDLES.*	D. H. GOODELL, LIGHTNING AND TURN TABLE APPLE PARERS.
Ten Eyck Mfg. Co., SLEDGES, *GRUB HOES,* HATCHETS, &c.	Woods Cutlery Co., Hot Water Proof TABLE CUTLERY.	ELEPHANT AXES, HATCHETS, EDGE TOOLS.
ALWAYS COOL *STOVE LID LIFTERS,* Ventilated Handles.	H. T. MILLER HATCHETS.	CHALLENGE AUGERS and BITS, *Croton Falls Manuf'g Co.*

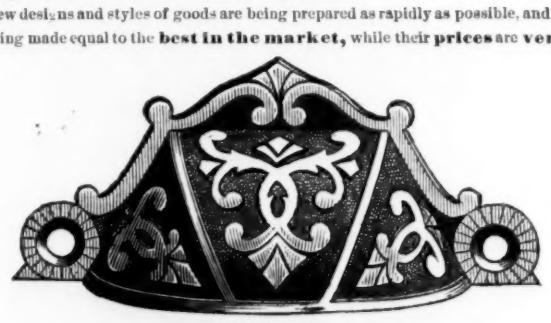
YALE LOCK MFG. CO.

Office and Works at STAMFORD, Conn.



Salesroom No. 298 Broadway, New York.

Are now prepared to execute orders for their new line of
ORNAMENTAL REAL BRONZE HARDWARE,
Illustrated Catalogues of which will be furnished on application.
Numerous new designs and styles of goods are being prepared as rapidly as possible, and the **quality** these goods is being made equal to the **best in the market,** while their **prices** are **very favorable**



DRAWER PULL.

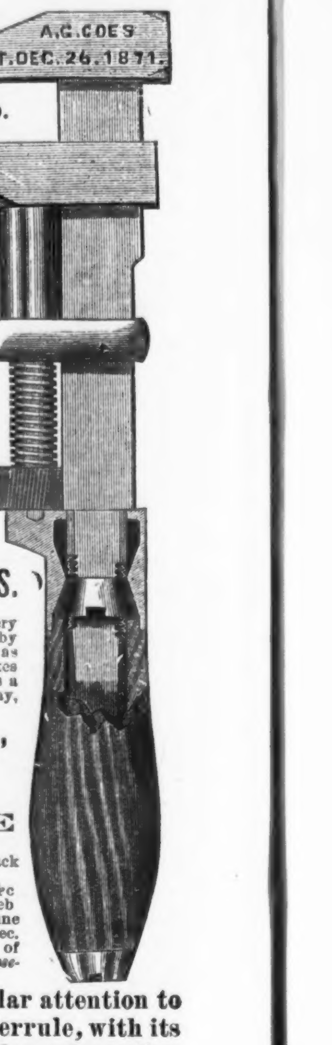
Ludlow Valve Mfg. Co.,
OFFICE AND WORKS:
938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.,
MAKE
VALVES
(Double and Single Gate, ¼ in. to 36 in.—outside and inside Screws, Indicator, &c.) for Gas, Water and Steam.
Send for Circular.

Price: Japanned No. 6, $5; Coppered No. 6, $6; Silvered No. 6, $8.
Liberal discount to the trade. All springs warranted to be of the best Steel Wire.
Depots: HYATT & SPENCER, 54 Beekman St., N. Y. SIDNEY SHEPARD CO., 68 Main St., Buffalo, N. Y. PALMER & GRAY, 225 Elm St., Cincinnati, Ohio. Factory, Indianapolis, Ind.

The Iron Age Directory

and Index to Advertisements.

WILLIAMS WHITE & CHURCHILL,
Successors to
MACKRELL & RICHARDSON MFG. COMPANY,
Manufacturers of
Builders' Hardware,
Locks, Hinges, Hooks and Staples,
Awning Hooks, Meat Hooks, Pincers,
Champion Noiseless Pulleys,
CHAIN PULLEYS, &c.
Factory, cor. Flushing and Nostrand Avenues
BROOKLYN.
Warehouse, 73 Warren St., N. Y.



Established in 1839.

A. G. COES & CO.
WORCESTER,
Mass.,
Manufacturers of
THE GENUINE
COES'
SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar WIDE*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'
NEW PATENT
FERRULE

Which cannot be forced back into the handle.
☞ Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be *vigorously prosecuted.*

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

G E R S 1 8 1 0

Genuine Emerson's Razor Strap.
[ESTABLISHED 1810.]

Ent'd according to Act of Congress in the year 1860, by Benj. F. Badger, in the Clerk's Office of the Dis. Court of Mass.

Vulcan Manufacturing Co.,
61 Warren Street, cor. College Place, New York.
MANUFACTURERS OF
MILES' FAMILY AND BUTCHERS' MEAT CUTTERS,
And Butchers' Machinery, Tools & Fixtures
of every kind.

Miles' "Challenge" Family Meat Cutter.

This Machine has the following advantages over all other Cylinder Meat Cutters:
1st. **It is much more simple in its construction.** There are but three different parts inside of the machine, all of which can be readily taken out, separated, cleaned and replaced; consequently there is no place about the machine where meat or the juices of meat can get lodged and become rancid.
2d. The fingers on the arbor are so arranged that the knives shear close to them when the machine is in operation, thus **cutting the meat cleanly and evenly,** instead of tearing it apart like other Cylinder Meat Cutters.
3d. The knives are firmly held in their places—at one end by the block of iron into which they are cast, and at the other end by the grooves in the arbor, into which they fit; making it impossible for one to break while cutting meat.
4th. The ends of the knives thus entering into the grooves make bearing for the arbor, and prevent it from breaking or springing.
5th. The machine will cut more easily and more rapidly than any other Meat Cutter.

C. HAMMOND & SON,
Mfrs. of Hammers, Edge Tools, Railroad, Machinists' & Blacksmiths' Tools,
Office and Sample Rooms, 13 N. 5th Street, PHILADELPHIA.

Unfinished Picks....$ 8 00 per doz
Finished Picks....10 00 per doz
Finished Swedish Iron Picks..12 00 per doz

Hardware.

ROY & COMPANY,

West Troy, N. Y.,

Manufacturers of

Wrought Iron Butts, Strap and T Hinges,

PLATE AND HOOK HINGES,

Cold Pressed Nuts and Washers, Felloe Clips, &c.

JOHN L. FISHER, Agent, 116 Duane Street, New York.

SPEAR & JACKSON

Sheffield, England,

MANUFACTURERS OF

Saws, Files, Edge Tools and Steel

JOHN L. FISHER. Agent,

116 Duane Street, NEW YORK.

STANLEY WORKS,

MANUFACTURERS OF

Wrought Butts, Strap and T Hinges.
Bronzed Butts and Bolts.
Wrought Barrel, Square and Shutter Bolts.
Wrought Chest Handles, Washers, Flush Bolts, &c

79 CHAMBERS ST., NEW YORK.

Factory at New Britain, CONNECTICUT.

HILGER & SONS,

87 Chambers and 69 Reade Streets, NEW YORK

MANUFACTURERS AND IMPORTERS OF

German Hardware, Cutlery, Scissors, Coffin Lace, Sheep Shears

Ball Braces, Bright Halter and Coil Chains, &c.

Also, Birmingham and Sheffield Hardware and Chains, Butcher's Files, Edge Tools & Razors, Wostenholm's Razors & Farriers' Knives, John Wilson's Butcher Knives and Steels, Stub's Tapers, Chesterman's Metallic Tapes, Isaac Greave's Hedge Shears, James Bees & Parkin's Spoke Shaves, Turn Screws and Braces, Pad Locks, Goulcher's Gun Locks, Brades Trowels, &c.

HERMANN BOKER & CO.,

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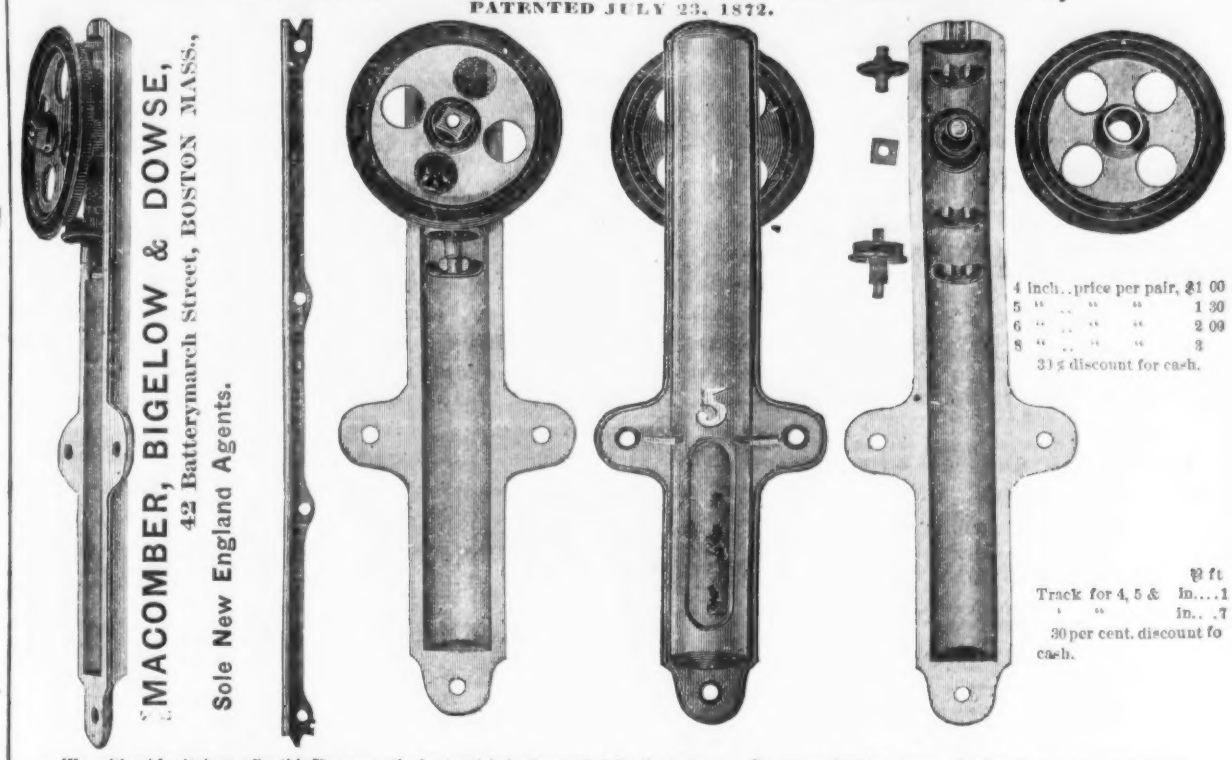

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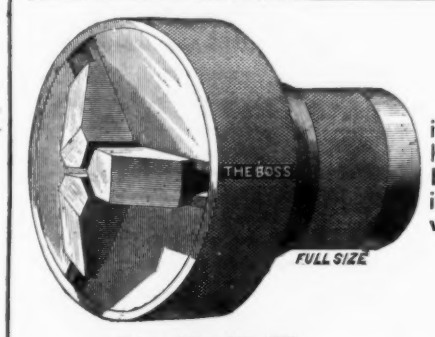

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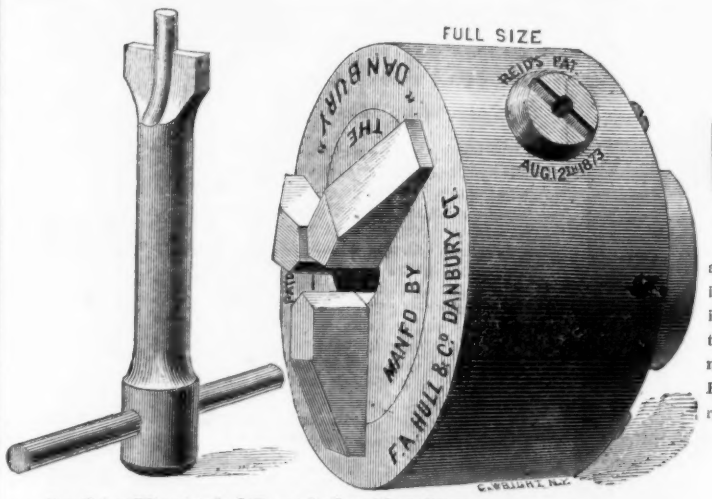

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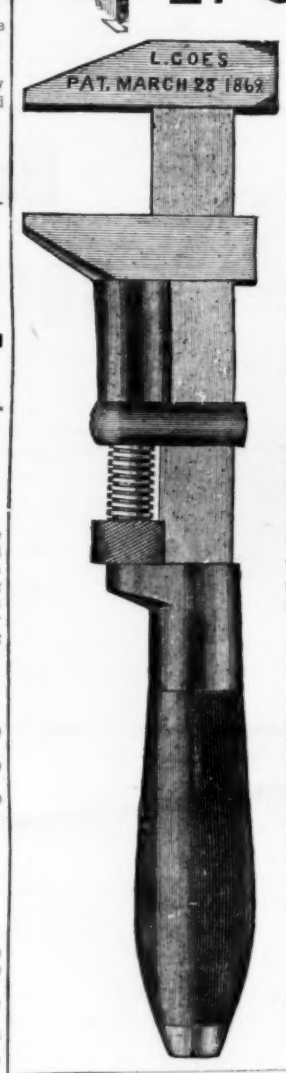

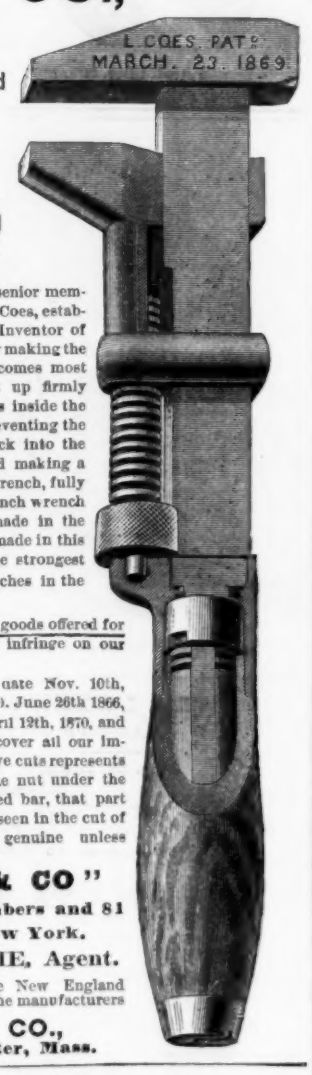

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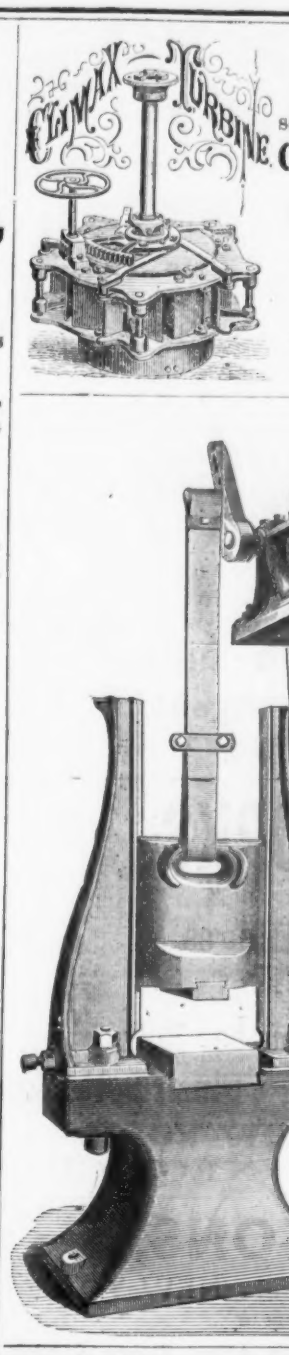

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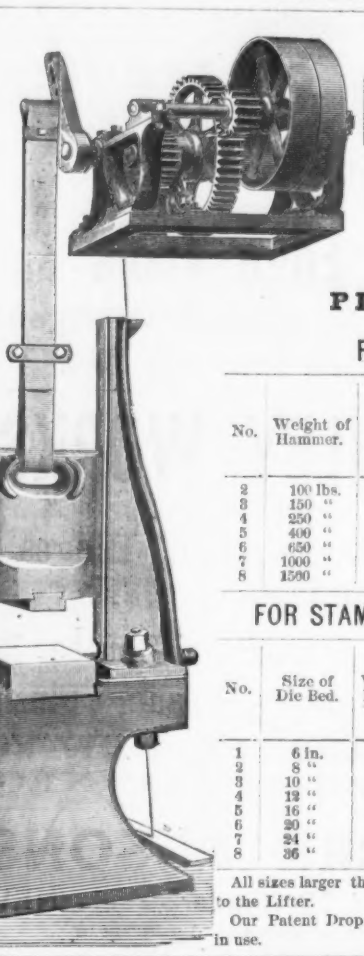

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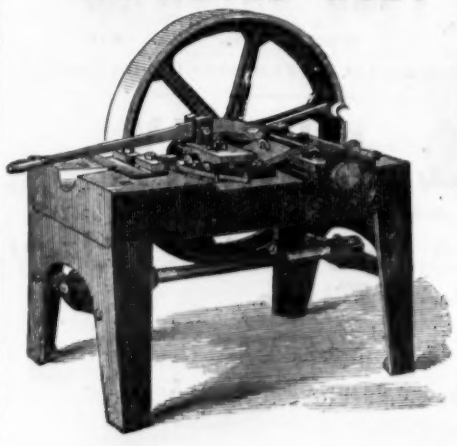

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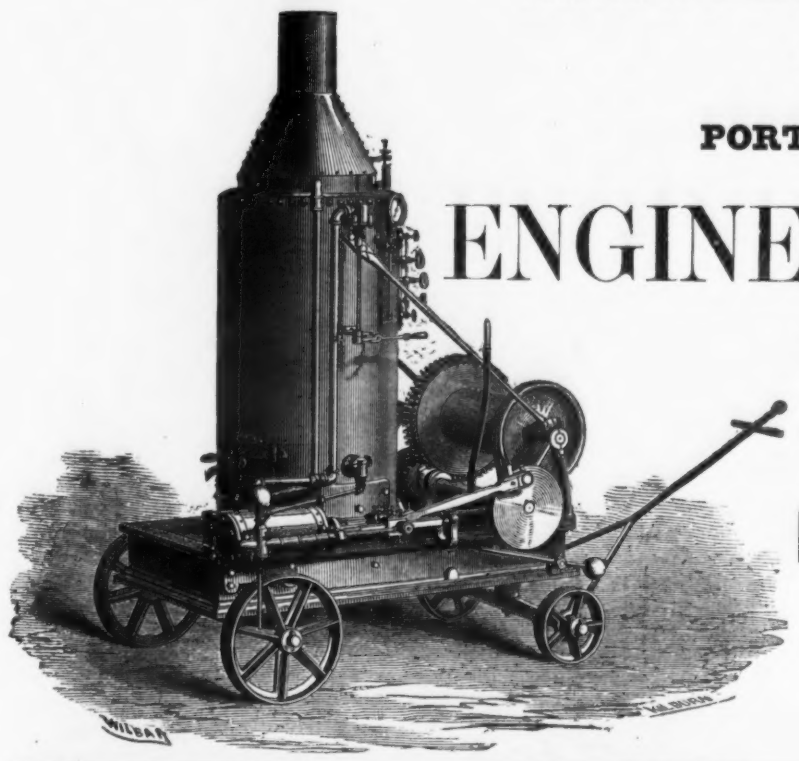

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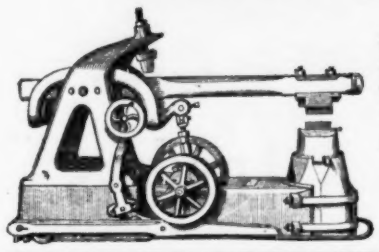

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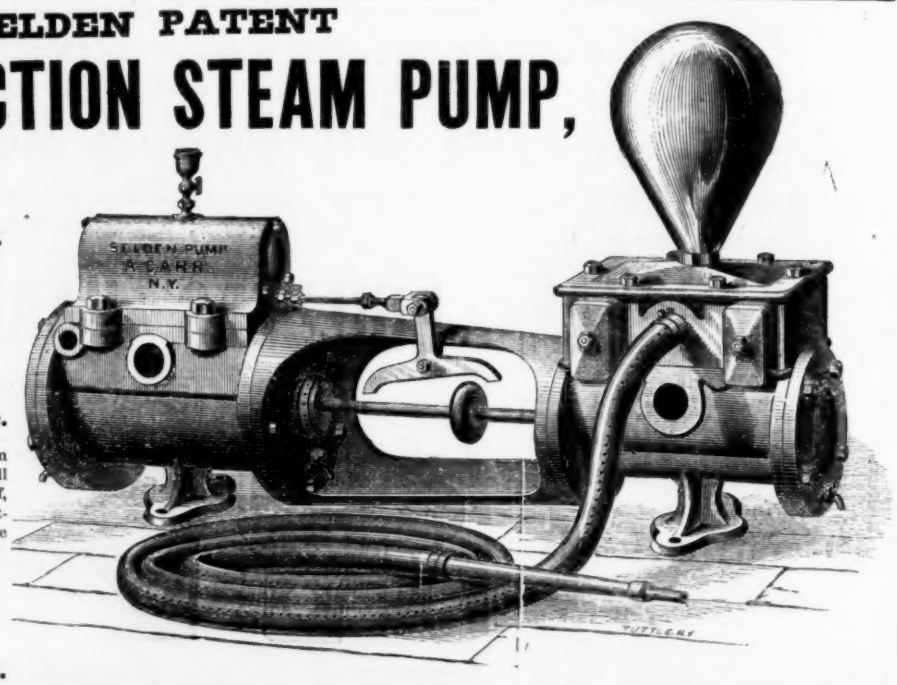

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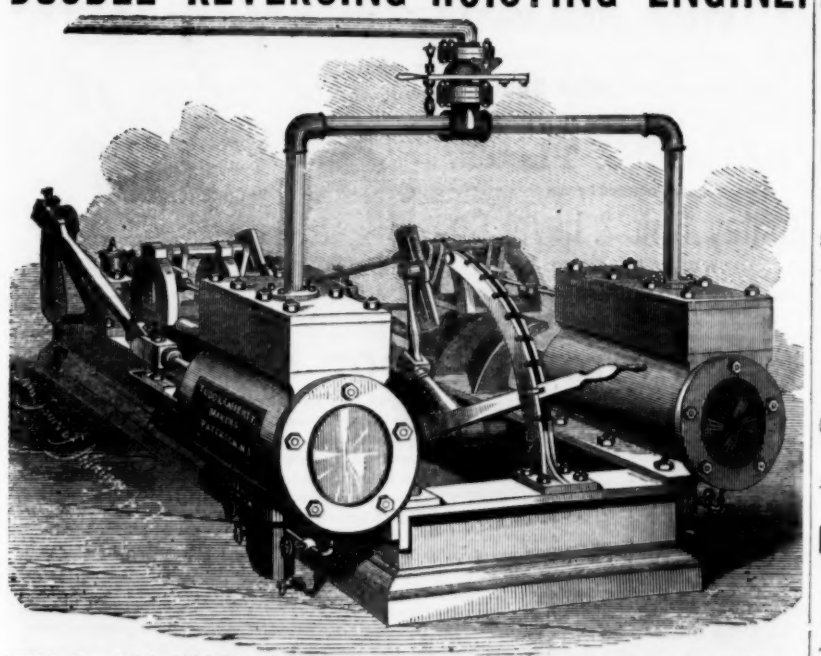

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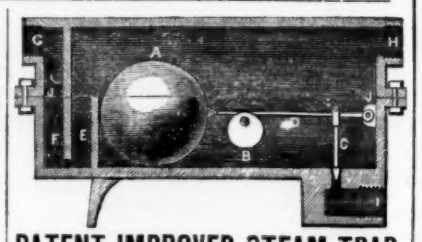

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WHITE LEAD Dry and in Oil,
Lead Pipe, Sheet and Bar Lead.
S. G. CORNELL, Prest. A. P. THOMPSON, Vice-Prest.
S. DOUGLAS CORNELL, Secy.

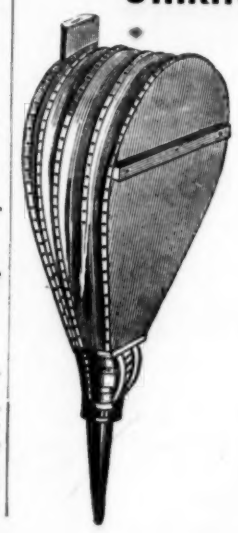
THE UNION WHITE LEAD MANUFACTURING COMPANY. PURE

Union White Lead Mfg. Company
26 Burling Slip, New York.,
B. W. How, Secretary. James How, President
MANUFACTURERS OF
White Lead, Red Lead, Litharge
Orange Mineral.

NEWCOMB BRO'S SONS.

Manufacturers of

Smiths', Moulders' and Hand



Also the Sole Manufacturers of

Bowden's Pate n

TRIPLE-ACTION

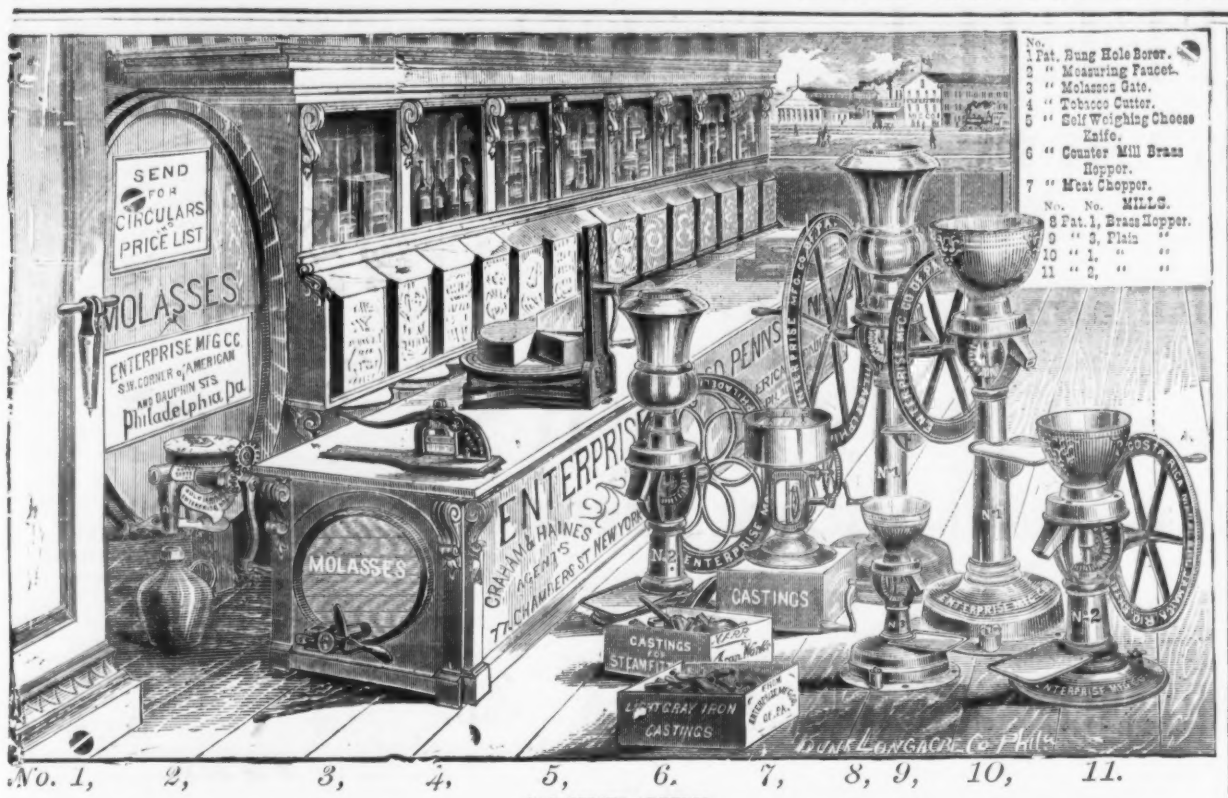
Bellows.

These Bellows are superior to all others now in use.

For further particulars send for descriptive circular and price list.

586 Water St., near Montgomery, N. Y.

Canal Street, East Broadway and South Street Cars cross Montgomery St.



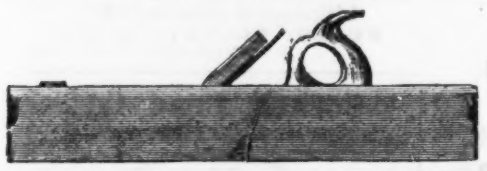
FOR PRICES ADDRESS

ENTERPRISE MFG. CO., of Pa., or **GRAHAM & HAINES, Agents,**
HARDWARE MANUFACTURERS, 88 Chambers St., New York.
W. Cor. of American and Dauphin Sts., PHILADELPHIA.

SANDUSKY TOOL CO.,

MANUFACTURERS OF

Planes, Plane Irons, Carpenters', Cabinet Makers' and Coopers' Tools,



Bench, Hand and Tail Screws, and Chisel, File and Auger Handles.

SANDUSKY TOOL CO., Sandusky, Ohio, or GRAHAM & HAINES, 88 Chambers Street, N. Y.

Headquarters for

Henry Disston & Sons' Saws,

Hand, Mill, Circular and Cross Cut.

ALSO,

Plumbs and Levels, Try Squares, Gauges, Trowels and Barker's Reversible Butt.

A full assortment constantly on hand. Address orders to

GRAHAM & HAINES, 88 Chambers Street, N. Y.

Excelsior Manufacturing Company's CLUB SKATES,

GRAHAM & HAINES, Sole Agents,
88 Chambers Street, New York.

These Skates are made of Cast Steel, and very much improved over past season. Our No. 20 and 25 are now superior to anything in the market, and the low price at which we offer them make them very desirable for both retailer and jobber.

Per Pair	$3 25	$3 50	$4 00	$5 00	Discount 35 per cent.
Number	50	40	25	20	

Philadelphia Tool Co.,

MANUFACTURERS OF

Davis' Patent Duplex Wrench,

A tool well made of **Best Materials**, combining all the good qualities of a regular Nut Wrench of equal size with that of at least six pairs of Pipe Tongs. For circulars and price lists, address,

PHILADELPHIA TOOL Co., Office & Works, S. W. cor. 13th & Buttonwood Streets, Phila.,
Or *GRAHAM & HAINES, Agents, 88 Chambers Street N. Y.*

AMERICAN BUTT CO.,

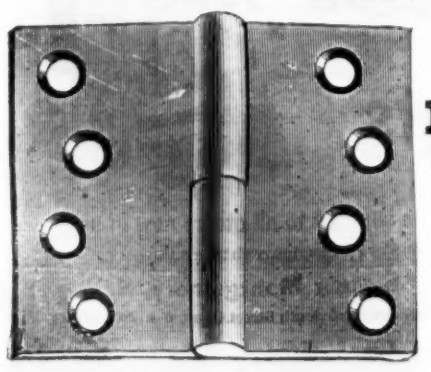
PROVIDENCE, R. I., Manufacturers of

Cast Butt Hinges,

AND

BUILDERS'

HARDWARE.



New York Warehouse with

Messrs. GRAHAM & HAINES,
No. 88 Chambers Street.

Send for Price List.

Al kinds of

SMALL CASTINGS

Made to order.

AGENCY SMITH & WESSON Revolvers,

WESSON RIFLES,

DEXTER

BREECH LOADING SINGLE GUN.

79 Chambers St., N. Y.

M. W. ROBINSON, Sole Agent.

VIENNA PREMIUMS.

THE WILSON SHUTTLE

SEWING MACHINES

Received the Grand

PRIZE MEDAL

AND MEDAL OF HONOR

FOR THE

Best Sewing Machine

The Best made Sewing Machines,

And Three

Co-Operative Medals

FOR

The Best Made Set of Harness,
The Best Made Side Saddle,
The Best Boot and Shoe Work,
And the Best Samples of Cloth Sewing.

No other Sewing Machines received Premiums on their merits, which we will prove by evidence at our office, and that all reports relating to the contrary are fal-

AGENTS WANTED,

WILSON SEWING MACHINE CO.,
707 Broadway, New York,
And all other cities in the United States.

OILERS! OILERS!

J. H. WHITE, Newark, N. J.,

MANUFACTURER OF

Olmsted Patent and Common Oilers,

of all descriptions,

Colwell Patent Door Spring Children's Carriage Trimmings, Spun and Stamped Brass for all Trades, Dies and Tools &c., &c.

SCHOVERLING & DALY,

84 and 86 Chambers Street, NEW YORK.

MANUFACTURERS OF

CHARLES DALY Breech Loading Guns.

Side Snap, Golcher and Scott Systems,

Equal in every respect to the highest priced. Send for Illustrated Catalogue.

New Standard Revolvers,

XX uses Metal Cartridge No. 22.
XXX " " " No. 30.

Quality, first-class; style, similar to Smith & Wesson; price, $2·50 to $3·00 less.

Vest Pocket O. K. & Never Miss

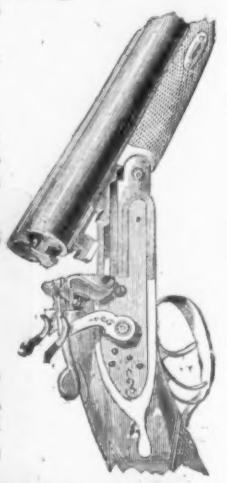
Single Cartridge Pistols.

Sole Agents for

Wm. Powell & Son's

Celebrated Breech Loaders,

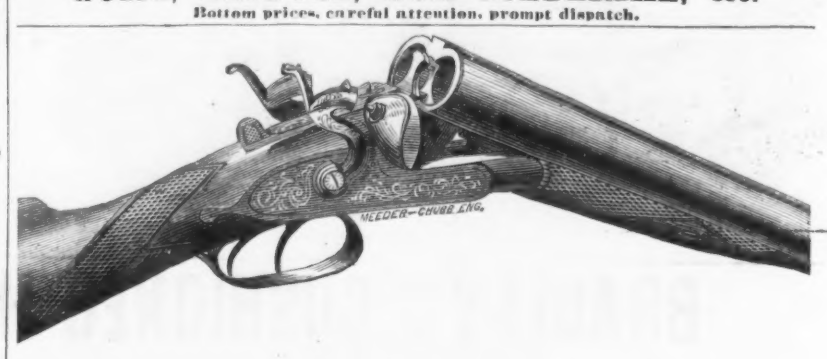
Wesson's New 7-Shot



Revolver; Wrought Iron Frame, beautiful model, work unsurpassed.

GUNS, PISTOLS, GUN MATERIAL, &c.

Bottom prices, careful attention, prompt dispatch.



SPIES, KISSAM & CO.,

279 BROADWAY, NEW YORK,

"Scott's Breech Loaders."

IMPORTERS OF ALL STYLES OF

Double and Single Guns and Sportsmen's Goods.

Colt's New Cartridge Revolvers, very compact and positively perfect.

Send for Samples.

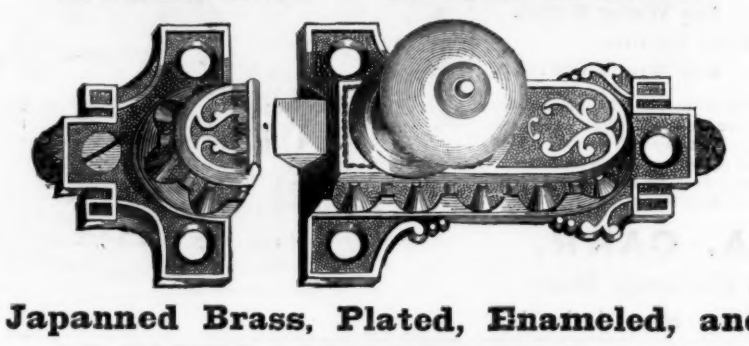
The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS OF

BUILDERS' HARDWARE.



Japanned Brass, Plated, Enameled, and Bronze Metal Door Bolts,

Cupboard Catches, Sash Fasteners, Drawer Pulls,

STORE DOOR HANDLES, etc., in great variety.

Send for our New Catalogue and Price List.

☞ Over 60,000 Sold.

BAILEY'S PATENT

Adjustable Planes.

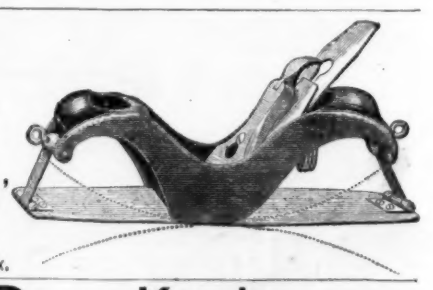
Manufactured by the

Stanley Rule & Level Co.,

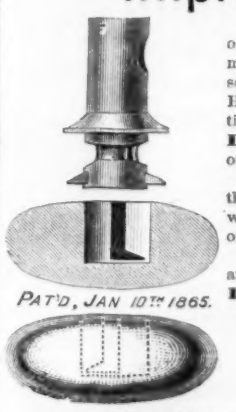
NEW BRITAIN, CONN.

Sold by all Hardware Dealers.

Warehouse, 55 Chambers St., New York.



Improved Door Knobs.



On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st,, page 11, for reduced list prices on Locks and Latches; also, for illustrated description of our patent **Telescope Locks and Latches**, with patent Flat **Steel Perforated Keys**,

Address

BRANFORD LOCK WORKS,
Branford, Conn.

Or THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,
18 & 20 Cliff and 243 & 245 Pearl Streets, New York.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel.....₱ lb 12½c
Peter Wright's.....₱ lb, gold, 13c @ 12½c
Wilkinson's.....11½c
Eagle.....₱ lb 12 cents, currency—dis 10 @ 15 %
Apple Parers.—Reading Improved.....per doz $8 50
Victor, Improved..... " 8 25
Union, " ..... " 8 00
Turn Table, " ..... " 8 50
Discount for 25 dozen lots..... 50c
Axes.—Mann's Light.....Per doz. $13 00 @ 14 00
Hunt's Light..... " 14 00 @ 14 50
Red Indian, all sizes..... " 12 50 @ 12 00
Red Chieftain, all sizes..... " 12 50 @ 13 00
Crown Prince..... " 13 50 @ 13 00
Augers and Auger Bits.—Pierce's Pat.
Twist Bits.....dis 25 %
Bates' & Ives' Bits.....dis 25 @ 30 %
Douglass' Bits.....dis 25 @ 30 %
Cook's Bits.....dis30 @ 30&10 %
Bonney's Pat. Hollow Augers.....dis 25 %
Russell Jennings' Bits.....dis 10 %
Bates' & Ives Nut Augers.....dis 25 @ 30 %
Douglass Nut Augers.....dis 30 %
Watrous' Ship Augers.....dis 10 %
Balances.—Landers, Frary & Clark's.....dis 10 @ 15 %
Chatillon's.....dis 10 @ 15 %
Morton's.....dis 10 @ 15 %
Common Spring, with Hook.....₱ doz $1 38 @ 2 00
Bells.—Bevin Bros. Mfg. Co. Hand Bells.....dis 50&10 %
" Extra Light Hand Bells.....dis 60 %
Other makers light.....dis 55 @ 60 %
Conneli's Door Bells.....old list net
Western and Kentucky.....dis 50 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 10 @ 15 %
Douglas' Mfg. Co., complete with augers..dis 10 @ 15 %
Common Augers.....$4 25 @ 4 00
Auguar, Extra Auger..... 5 50 @ 5 00
Bolts.—Eastern Carriage Bolts.....dis 50 %
Western " " .....dis 50 %
Philadelphia " " .....dis 45 @ 50 %
Wrought Shutter Bolts.....dis 45 %
Cast " " .....dis 35 %
Braces.—Barber's.....dis 40 %
Bartholomew's.....dis 10 @ 15 %
Spoffard.....dis 37½ %
Butts.—Cast Fast Joint, Narrow.....dis 40 %
" " Broad.....dis 40 %
Cast Loose Joint.....dis 50 %
" Acorn Drilled.....dis 40 %
Wrought Loose Pin.....dis 30&5 %
" Table Hinges and Back Flaps.....dis 30 %
" Narrow.....dis 30&5 %
" Loose Joint.....dis 35&5 %
Parker's Blind Butts, Shepard's " " } dis 40 %; by the case, dis 40&10 %
Clark's " "
Garretson's " .....dis 45 %; by the case, dis 50 %
Lull & Porter's " .....dis 25&10 %
Chains.—German Halter.....gold list dis 20 @ 25 %
" Coil.....gold list dis 20 @ 25 %
Galvanized Pump.....₱ lb 13c
Best Proof Coil Chain—
₱ lb..... 13¼ 10¼ 10 9½ 9¼ 9 8½c gold
3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝ in.
By the cask, 560 lbs., discount ½c per lb. Common Chain, ½c per lb. less than proof.
Chisels.—Socket Framing.....dis 60 @ 60&5 %
Socket Firmer.....dis 60 @ 60&5 %
Tang " .....dis 40 @ 40&5 %
Beaty's Framing and Firmer.....dis 10 @ 10&5 %
Casters.—Porcelain Wheel.....dis 20&10 %
Iron.....dis 20&10 %
Brass.....dis 20&10 %
Clothes Wringers.—Universal..... per doz $72 00
Novelty..... " 72 00
Reliance..... " 72 00
Providence..... " 72 00
Orders of or 5 dozen, discount $3 per dozen.
King Wringers (Iron Frame).....per doz $68 00
Coffee Mills.—Common Box and Side.....dis 10 @ 15 %
Patent Box and Side.....dis 10 @ 15 %
Cutlery.—American Pocket (best).....dis 20 @ 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.'s.....dis 60 @ 60&5 %
Concave Adjustable Handle.....dis 10 %
Beaty.....dis 10 %
Files.—Nicholson Mill Files.....new list, $5 00 to £ cwt
Nicholson Bastard..... " 5 00 to £ cwt
" Taper..... " 5 00 to £ cwt
Butcher's Mill..... $5 75 to £ gold
" Bastard..... 5 50 to £ gold
" Taper..... 5 50 to £ gold
Moss & Gamble—Mill, Taper and Bastard.....5 50 @ 5 25 to £ gold
Fluting Machines.
Royal, No. 1, 4½ inch Rollers.....list $6 00
" No. 2, 6 " " .....list 7 00
Hammers and Hatchets.
Yerkes & Plumb's.....dis 10 %
Hammond & Son's.....dis 5 %
Beatty's.....dis 10 %
Hinges.—Strap and T.....dis 30&7½ %
Bonney's No. 1 Gate.....dis 25 %
" No. 2 and 3.....dis 35 %

Horse Nails.

	Nos. 6	7	8	9	10
Ausable	27	25	24	23	22
Globe	29	26	25	24	23
Brundage	26	24	23	22	21
	Nos. 5	6	7	8	9
Putnam	32	28	26	25	24

On Ausable, Globe and Brundage 1000 lb lots.....dis 5 %

Knobs.—Door (regular manufacture).....dis 40 %
Porcelain and Mineral.....dis 40 %
Locks and Latches.—Rim and Mortise.....dis 40 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 40 %
Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....net @ dis 10 %
Mattocks.—Long and Short Cutter.....dis 15 %
Western Pattern.....dis 15 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincoln's " .....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Rakes.—Cast Steel Garden.....dis 30 %
Malleable Garden.....dis 33⅓ %
Wood Head Iron Teeth.....dis 30 @ 40 %
Rules.—Stanley Rule and Level Co.....dis 60 @ 60&10 %
Steven's and Hubbard's.....dis 60 @ 60&10 %
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Diston's Cross Cut.....dis 12½ %
Diston's Hand.....dis 12½ %
W. McNiece's H'd. Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb. 1873.....dis 20&10 %
" Back Strap " .....dis 20&10 %
Oliver Ames & Sons.....new list dis 10 %
Brady Shovel Co.....dis 7½ %
Sad Irons.—Reading (planed face).....per lb. 4½c.
Coquanock (polished face)..... " 4¾c.
Stove Polish.—Gem.....₱ gross, $5 00
Onyx..... " $5 00
Scythes.—Golden Clipper.....₱ doz. $11 50
Clipper No. 10..... " 10 50
Common Scythes.....₱ doz $7 00 @ 10 00
Screws.—Iron.....new list, April 1st, 1873, dis 47½ %
Brass.....dis 50&10 %
Spoons.—
Plated Spoons, Rogers Bros.'...new list dis 30 @ 30&5 %
Britannia. Spoons.....dis 40 @ 40&5 %
German Silver.....new list dis 10 @ 15 %
" Light.....new list dis 15&5 %
Try Squares.—Diston's.....dis 12½ %
Stanley Rule and Level Co.....dis 40&10 %
Willis Thrall, No. 2.....dis 30&10 %
Willis Thrall, No. 1.....dis 25&10 %
Tacks, &c.—Half Weight Tacks.....dis 67½ %
" " by the case.....dis 67&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " " .....dis 20&10 %
Wrenches.—Coes Genuine.....dis 30 @ 30&10 %
Coes Imitation Wrought Bar.....dis 45 @ 45&5 %
" " Malleable Bar.....dis 50 @ 50&5 %
" " (Kellogg) Malleable Bar.....dis 55 @ 60 %
Tafts Pattern.....60 %
" " Kellogg's.....dis 60&10 %
Wire.—No. 0 to 18.....dis 30 %
No. 19 to 26.....dis 40 %
No. 27 to 36.....dis 33½ @ 35 %
Coppered 0 to 12.....dis 1 @ 30 %
Tinned Broom Wire.....dis 15 @ 20 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
Oct. 11, 1873.

Axes, Chopping—"Francis Axe Co "....$13 00 @ $14 50
Augers—C. S. Cut.....dis 30&10 %
Bits, Auger—Pierce's.....dis 25 %
Jennings'.....dis 10 %
Bells, Cow—Yaw's Genuine.....dis 20 %
Bellows—Smiths'.....dis 20 %
Bolts—Carriage and Tire.....dis 70&10 %
Braces, Bit—Barber's.....dis 40 %
Spofford's Patent.....dis 40 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 20 %
Cast Loose Joint.....dis 50 %
" " Pin.....dis 45 %
" " Japanned.....dis 45 %
" " Silver Tipped.....dis 25 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 35 %
" Table and Back Flaps.....dis 25 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 35½ %
Leather, new list.....dis 30 @ 30&5 %
Beaters, Egg, "Peerless".....per doz $4 50
Brick—Bath (box of 2 doz) Best English.....$1 50
" Rutherford".....$1 25
Bung Borers—"Enterprise".....dis 20 %
Chalk—White, Carpenter's.....₱ gross, 60c
Red, Carpenter's..... " 80c
Blue, " ..... " 90c
Crayon School..... " 14c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable.....₱ lb 10½c
Cherry Seeders.....per doz $12 00
Elbows—Corrugated..... 5 5½ 6 7 } dis 15 %
Charcoal.....$4 25 5 25 5 25 6 50
Russia.....10 00 13 00 13 00 14 00
Files—Wheeler, Madden & Clemson's.....dis 45 %
Freezers, Ice Cream—"Champion".....dis 30½ %
Gates—Molasses—
Patent Self-Measuring.....₱ doz., $42 00; dis 20 %
Hinges—Window Blind—
Clark's No. 20.....dis 50&5 %
Shepard's Standard, and Clark's.....dis 40&10 %
Garretson's.....dis 40, 10&10 %
Wrought Strap and T.....dis 30&7½ %
Hods, Coal—Plain, Black and Galvanized.....net @ 10 %
Funnel, Black and Galvanized.....net @ 10 %
Fancy and Helmet.....net @ 10 %
Palace Coal Vases.....net
Hammers—Maydole's.....net
Yerkes & Plumb's.....dis 5 @ 10 %
Hooks and Staples—Wrought.....
Hooks—Belt.....dis 50 %
Hasps and Staples—Wrought.....dis 60 %
Sad Irons.....₱ lb 5c
Kettles—Brass.....₱ lb, 50c
Enameled.....new list dis 40 %
Knives, Drawing—Oval No. 1.....dis 60&10 %
Razor Blade.....dis 50&10 %
Lanterns "Peerless,"....No. 1 5 10
₱ doz $26 00 $11 25 $13 75 dis 10 %
"Radiant".....No 75 100 150 175
₱ doz $13 13 $13 13 $22 50 $22 50 dis 20 %
Tubular.....$13 00
" with Guards.....13 50
Machines—Apple Paring, "Reading,".....$8 50 ₱ doz
Mills, Coffee—Box and Slide, common.....dis 15 %
Box Union and Eagle.....dis 15 %
"Enterprise".....dis 20 %
Nails—Cut, Chesapeake.....$4 50
Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Finished & Pointed.....and 1c ₱ lb
" " 1000 lbs.....dis 5 %
" Clinton.....No. 6 7 8 9 10
22 20 19 18 17c
Packing—Rubber.....dis 30 @ 35½ %
Pencils, Slate—soapstone.....4 5 6 in.
30 40 50c. ₱ 100
Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₱ lb 9 c
Rivets—Iron, Black and Tinned.....dis 20 @ 25 %
Copper.....dis 10 %
Rope—Manila, ¾ inch and larger.....₱ lb 17½c
Rules—Boxwood and Ivory, Stephens.....dis 50&10 %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 47½ %
Flat Head, Brass.....dis 60 %
Staples—Blind, Boardman's Pat., ½ & ⅝.....c ₱ 37½c
Skates—White's.....
Barney & Berry's—N. Y. Club Japanned Top.....$2 20
" " B. & B. Club Blued Top..... 2 85
" " B. & B. all Clamp, Nickel Plat. Fastening..... 4 25
" " B. & B. Rink.....10 50
Straps, Skate—Russet and Black.....net @ 20
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 30&5 %
Britannia.....dis 40 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₱ keg $6 50
Shovels & Spades—Shepard, Forsyth & Dennison..dis 20 %
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Shears—Seymour's.....dis 50 @ 1 %
Traps, Steel—New house.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 67½&7½ %
Vises—Parallel, Buffalo.....dis 15 %
Wrenches—Coes' genuine.....dis 30&10 %
Coes' Imitation.....dis 50&10 %
Tafts' Pattern.....dis 65&10 %
Ware—French, Tinned and Iron.....
Stamped and Japanned.....
Cast Iron Hollow.....dis 25 %
Tin Plates.—Add for each X.....2 50
10x14, IC. Charcoal...$7 00 | 14x20 C. terne.....$11 25
12x12, " ... 13 50 | 20x28 C. " 31 50
12½x17, " ... 11 50 | 20x28 X. " 28 00
14x20, " ... 15 00
Pig Tin—Straits.....38c @ 39
Banca.....44c @ 45
Bar Tin.....40c
Solder.....No. 1, 21 c; No. 2, 19 c
Sheet Zinc—
"Lasalle".....5 cask lots, 9 00 | 200 lb casks, $11 20 | 100 lb casks, $11 30 ₱ 100 lbs
Iron Wire—Bright and Annealed.....dis 20 %
Coppered.....dis 25 %
Tinned.....dis 15 %
Tinned Broom, Nos. 20 21 22 .....dis 20 %
20c 21c 21c
Copper—Sheathing 14 @ 18 oz.....₱ lb 37c
Planished.....₱ lb 41 @ 43c
Bottoms.....₱ lb 39c
Bolts.....₱ lb 40c
Braziers' Sheets.....₱ lb 40c
Sheet Iron.—
18 Common.....$5 60
24 Common..... 6 00
24 W. D. Wood & Co., Smooth Finish..... 7 25
Am. Russia..... A. B.
14c 12c
Gen. Russia, No. 1 stained.....21c
" " clean.....23c
Galvanized.....dis 25 %

PITTSBURGH.

Card Rates, 60 days.

Flat Bar—
1½ to 4 x ⅛ to 1 inch..3·8c
4½ to 6 x ⅜ to 1 inch..4·0c
1¾ to 6 x 1⅛ to 1¼ in..4·2c
Horse Shoes.—
All sizes.....5·3c
Heavy Bands—
3½ to 6 x ¼ & 5-16 in..4·1c
1½ to 3½ x ⅛ & 5-16 in..4·5c
Light Bands.—
3 to 6 x 5-16 to No. 12..4·8c
1½ to 2¾ x 3-16 to No. 12..5·2c
Hoops.—2¼ to 3 in....5·1c
3½ to 4¾ in.....5·3c
1¾ to 2 in.....5·3c
1⅝ to 1 11-16 in.....5·6c
1⅛ & 1¼ in.....5·9c
Round and Square.—
1 to 1¼ in.....3·8c
2 to 2¾ in.....4·1c
3 to 3½ in.....4·3c
3¾ to 4 in.....4·8c
⅝ to 9-16 in.....4·2c
Oval Iron.—
⅝ to 1¾ in.....4·4c
⅞ to 1¾ in.....4·6c
Half Oval and Half Round.—
⅝ to 1¼ in.....4.7c
⅝ to ⅞ in.....5·2c
Sheet Iron, 10 to 14.....5·3
" 15 to 20.....6·0
" 21 to 24.....6·2
" 25 to 26.....6·4
" 27.....6·6
All sheets over 28 in. wide, ½c. ₱ lb extra.
Tank Iron—
3-16, ¼ & ⅝ in. thick..5·6c
Boiler Plate Iron.....5·5c
Heads not flanging.....6·1c
Railroad Iron.—
1¼ x ⅝, 7-16 & ½ in....4·3c
1¼ x ¼ & 5-16 in.....5·3c
Extras for Cutting to Length.—
Flat bars and rounds and squares.....1c
Flat bars for tire.....1c
Heavy bands.....3c
Nails—Standard list.....$4 50
100 keg lots 12½c. off.

1¼ & 1½ x ⅜ to ⅝ in....4·1c
1 & 1¼ x ¾ to ⅞ in.....4·1c
⅝, ¾ & ⅞ x ⅜ to ⅝ in..4·2c
Nail rods.....7·7c
⅜ to 1¼ x ¼ & 5-16 in....4·8c
½ to ¾ x ¼ & 5-16 in....5·0c
1 to 1¾ x 3-16 to No. 12..5·4c
½ to ⅞ x 3-16 to No. 12..6·0c
1 in.....6·3c
⅞ in.....6·8c
¾ in.....7·3c
⅞ in.....7·8c
½ in.....8·3c
½ to 7-16.....4·5c
⅝ in.....4·6c
5-16 in.....5·0c
¼ in.....5·4c
3-16 in.....7·4c
⅛ in.....4·8c
⅜ in.....5·4c

	Boiled.	Charcoal.	Jun.
Sheet Iron, 10 to 14	5·8	7·3	8·8
" 15 to 20	6·0	7·5	9·0
" 21 to 24	6·2	7·7	9·2
" 25 to 26	6·4	7·9	9·4
" 27	6·6	8·1	9·6

Heads flanging.....8·5c
Plow Slabs.....6·4c
Plow Wings.....6·9c
1¼ & 1¾ x ⅜ in.....4·3c
1¼ x ⅝ in.....4·5c
⅛ in.....4·8c
⅜ in.....5·4c
½ in.....5·9c
⅝ in.....7·4c
Light bands and wagon box iron.....4c
Hoops.....5c

The following are the Card rates of Lewis, Oliver & Phillips:

Iron, standard list, assorted sizes, for large orders, 3·8c, card rate, 2 % off net.
Iron Wedges.....5½c ₱ lb net
Norway Nail Rods.....9½c ₱ lb net
Fence Pickets—
⅝ round, bent to shape.30c ₱ ft. of fence, less 5 % off net
Discount off Standard List.
Carriage and Tire Bolts (new list).....60&15 % off net
Plow Bolts.....25 % off net
Stove Bolts.....at the list price
Machine and Square Head Bolts.....25 % off net
Coach and Lag Screws.....25 % off net
Bolt Ends.....20 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅝ in.....6 c ₱ lb off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....4½c ₱ lb off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅝ in.....7 c ₱ lb off net
Washers, all made from new band iron, large sizes, from 7-16 to 1¾ in.....5 c ₱ lb off net
Nuts and Washers in 25 lb. boxes, 1c ₱ lb ex. Nuts and Washers in lots less than one keg each size, 1c ₱ lb ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 5c ₱ lb net; ⅞, ¾ in. diam. 5c ₱ lb net; ⅝ in. diam. 5½c ₱ lb net.
Patent Headed Harrow Teeth, packed in casks, ½c ₱ lb ex
Skein Bolts, in bulk, in lots of 5 kegs or more, ⅝ in. diam. 8c ₱ lb net; 9-16 in. diam. 9c ₱ lb; ½ in. diam. 10c ₱ lb. 1c ₱ lb extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¾ to 1 in. diam. 9½c ₱ lb net; ⅝ in. diam. 10½c ₱ lb net; ½ in. diam. 12½c ₱ lb net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 5c in. long 7c ₱ lb net; 8, 10 & 12 in. long, 8½c ₱ lb net.
Strap and T Hinges.....20 % off net, delivered
Screw Hitching Rings.....$6 50 ₱ 100 net
Duck Nest Tuyere Irons.....$16 00 ₱ doz net
Cast Iron Washers.....₱ lb 4½c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ lb 5½c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 5½c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 6 c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 6½c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long " 6¾c net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₱ set of 8 bolts.. 55c
12 " ⅜ " " 8 " .. 70c
10 " 9-16 " " 8 " .. } 90c
12 " 9-16 " " 8 " .. }
14 " 9-16 " " 8 " .. $1 00
10 in. long by ⅝ at Screw End, ₱ set of 8 bolts.. } 1 00
12 " ⅝ " " 8 " .. }
14 " ⅝ " " 8 " .. 1 10
16 " ⅝ " " 8 " .. 1 20
5c ₱ set for each additional inch over 14 in. All lengths made.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₱ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....60c
" " 3 " " " 65c
" " 3¼ " " 70c
" " 3½ " " 75c
Wagon Brake Ratchets, each.....16½c
" " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " 2, each.....10 c
" " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 100 sets.....dis 25 %
Wagon Box Staples, 1¼ to 2½ in. to clinch, ₱ 1000 $13 50 net
" " Box Iron, to rivet on, ₱ 1000 9 50 net
Neck Yoke Eyes, each.....5½c net
" " with ⅝ rings, each.....8¾c net
King Bolts, ¾, 1, 1¼, and 1½ in. diam.....₱ lb 5¼c net
Wagon Rivets, ex. large, oval and steeple head, ½ in. diam. all lengths..... " 10 c net
Wagon Rivets, 3-16 in. diam., all lengths..... " 12 c net
" & Nails, in 5 lb paper boxes.... ₱ lb 1c extra
" " in 25 lb wood " .... " ½c extra
Wagon and Hinge Nails, ¼ in.....₱ lb 17 c net
" " 3-16 in..... " 19 c net
Double Tree Plates.....
Coupling " .....} " 9 c net
Tongue " .....
Neck Yoke Plates..... " 12 c net
Tongue Cap Iron, 1¾, 2 & 2¾ in. wide, same price ₱ lb as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₱ lb 11½c net; ¼ in., 12½c. net

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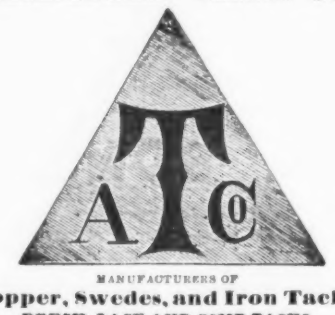

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Hungarian and Cigar Box Nails;
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RIVETS.
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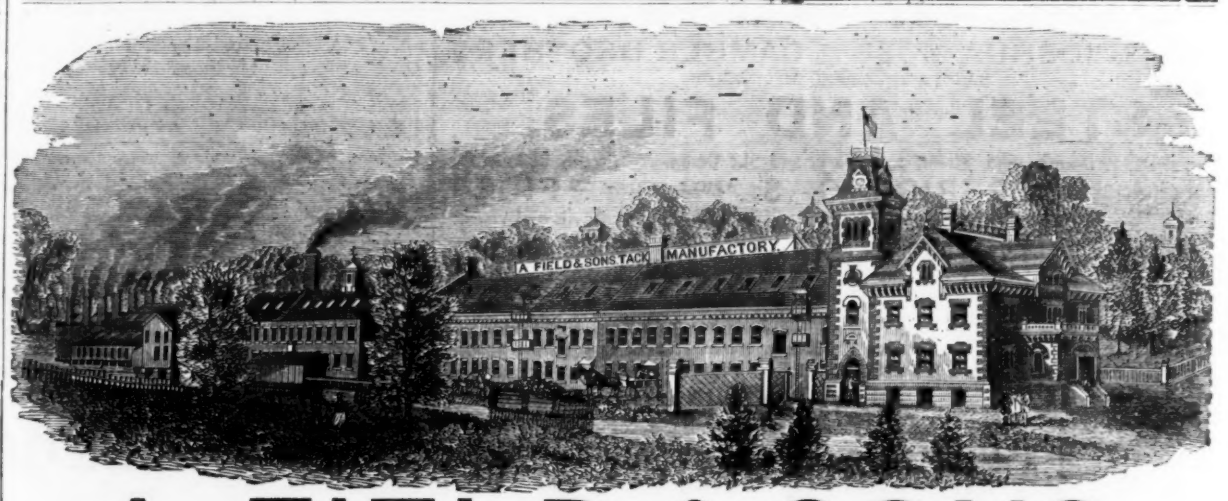

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"We take pleasure in commending the new agency to the favor of inventors." *The Iron Age*, June 6.

"Of Prof. James A. Whitney we can speak from a personal acquaintance. Any person seeking professional advice from him will be certain of just and honorable treatment." Norwich, Conn., *Daily Advertiser* May 29.

"His long experience in this field of investigation has made him familiar with the business in all its branches, and we can confidently recommend him to those needing his services." *Prairie Farmer*, Chicago, June 1.

"Few persons have had more opportunities for learning the necessities of such a business." *The World* (weekly), New York City, June 19.

"A thorough mechanical engineer with a valuable practical experience in the machine shop." *Am. Railway Times*, Boston, June 8.

"Mr. Whitney is qualified by experience and practical knowledge. His life and experience have been such as to develop the fullest sympathy with men engaged in industrial pursuits, especially inventors. *Moore's Rural New Yorker*, June 8.

Address, for full information, free of charge,

128 Broadway, Room 11, New York City.

BOSTON.

(*Reported by Macomber, Bigelow & Dowse, 42 to 48 Batterymarch St.*)

Axes.—Forester's Favorite, Bronzed.......$13 00
Blue Jackets, Blue....... 12 50
Chopper's Pride, Bronzed....... 11 00
Red Cross, Red....... 10 50
Red Cross, Handled....... 13 50
Boy's Handled Blue Jackets....... 12 00
Bells.—Hand.......dis 60&10 %
Sleigh, fancy body straps, patent leather, cloth bound, W. M., 30 bells, No. 1.......per strap $1 70
Sleigh, patent leather, cloth bound, W. M., 36 bells, No. 1.......per strap, $1 80
Sleigh, patent leather, leather bound, ex. tinned, 30 bells, No. 1.......per strap $2 38
Sleigh, patent leather, leather bound, ex. tinned, 36 bells, No. 1.......per strap $2 50
Sleigh, patent leather, leather bound, silver plated, 30 bells, No. 1.......per strap $3 38
Sleigh, patent leather, leather bound, silver plated, 36 bells, No. 1.......per strap $3 50
Sleigh, shaft straps, W. M., House, 6 bells, No. 1, ...per pair 75c
Bevels.—Star Tool Co.......dis 33⅓ %
Bolts.—Carriage, Phila., "Girard Works".......dis 40&5 %
Borers.—Angle, Backus'.......dis 30 %
Boring Machines.—Angle.......each $5 25
Common, Snell's quality.......each 4 00
Breast Drills.—Miller's Falls, $30 per doz.......dis 25 %
Braces.—Barber's.......dis 40 %
Backus'.......dis 45 %
Spofford's.......dis 40 %
Butts.—Union Drilled Loose Joint.......dis 45 %
" " Wire Fast Joint.......dis 35 %
" " Acorn Loose Joint.......dis 40 %
Alden's Drilled Plain, Reversible.......dis 35 %
" " Acorn, ".......dis 25&10 %
Wrought Table Butts and Back Flaps.......dis 25 %
Wrought Narrow Butts.......dis 30 %
Chisels.—
Socket Framing M., B. & D's, warranted...dis 60&10 %
Cordage.—Manila.......℘ ℔, 18c
American Tarred Hemp Lath Yarn.......℘ ℔, 10c
Cow Ties.—
No. 30, open ring, 3 ft., No. 6, with toggle..℘ doz $3 37
No. 35 " 3 ft., No. 6 " snap....℘ doz 3 62
No. 40 " 3½ ft., No. 5 " toggle..℘ doz 3 75
No. 45 " 3½ ft., No. 5 " snap....℘ doz 4 00
No. 50 " 4 ft., No. 4 " toggle..℘ doz 4 25
No. 55 " 4 ft., No. 4 " snap....℘ doz 4 50
No. 60 " 4½ ft., No. 3 " toggle..℘ doz 4 50
No. 65 " 4½ ft., No. 3 " snap....℘ doz 5 00
Crow Bars.—Iron, Steel Points.......℘ ℔, 6½c
Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12·00.......dis 25 %
No. 8, " outside " $18·00.......dis 25 %
Torrey's.......$4·00
Files.—Earl Smith & Co.'s English.......$5 to £ gold
American.......$5 to £ currency, less 10 %
Nicholson.......$5 to £ currency, less 7½ %
Funnel Irons.—$2·50 $2·50 $2·50 $3·25 per doz
5, 5½, 6, 7 inch
Deep Flange, $3·50 $3·75 $4·00 per doz
5, 5½, 6 inch
Gauges.—Star Tool Co.......dis 33⅓ %
Hammers.—Maydole.......dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, 8·75
" " " " " " bell face, No. 1, $11; 1½, $9·75.
Hangers & Rollers.—Novelty.......dis 30 %
Hatchets.—Underhill Edge Tool Co.......dis 10 %
Underhill pattern, solid, C. S. lathing.......$9 50
Hinges.—Strap and T. Stanley Works.......dis 30&7½ %
Plate, Loose, and Fast Joint.......℘ ℔, 8c
Wrought Screw Hook.......℘ ℔ 8c
Locks.—P. & F. Corbin.......dis 40 %
No. 408, Iron Face and Bolts, Mortise, 3½ inch, per doz net.......$1 88
No. 1000, reversible rim knob.......$2 25
Mattocks.—K. P. & Co., axe finish, long cutter..$13 75
Short cutter.......13 50
Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ℘ ℔
Nails.—10d. and larger.......$4 75
Paper.—Finest Quality Manila.......℘ ℔ 11c
Parers.—Reading, New Pattern.......per doz $8 00
Turn Table.......per doz 8 50
Picks.—K. P. & Co., Polished Points—
5 to 6.......per doz $10 00; 6 to 7, $10 50
Pulleys.—Clark & Co.'s Axle, 1½ in.—
.......per doz 37c.; 2 in., 42c
No. 115, Axle, 1½ in.......per doz 37c
Plated Ware.—Rogers Bros.......new list dis 30 %
Pocket Knives.—Conn. Cutlery Co.......new net list
Rivets.—Black.......dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8.
13 13 14 14 15 16c ℘ ℔ net
Sad Irons.—Reading.......℘ ℔ 4½
Saws.—Disston's.......dis 12½ %
Lightning X cut, Boynton's.......per foot 70c
" Saw Blades, 32 inch.......per doz $7 00
" Framed Saws.......per doz $10 00
Common " ".......per doz 6 00
Disston " ".......per doz 9 00
One man X cut.—Lightning.......per foot 77c
Disston's $3·00 each.......dis 12½ %
Saw Clamps.—Reading.......$11·25
Screws.—American Screw Co.......dis 47½ %
Shovels.—O. Ames.......new list dis 10 %
M. B. & D.......dis 10&5 %
Snow, malleable iron tip, D handle.......$6·50
" " " plain.......5·50
Sifters, Coal.—McMasters.......$12·00
Sinks.—Cast Iron, 2, 2½, 3, 3½, 4, 4½ feet.
$1·37 $1·62 $2·25 $2·75 $3·75 $4·75 each.
Tools.—Aiken's Pattern, 20 in set; Miller's Falls, $12·00 per doz.......dis 15 %
Traps.—Oneida.......dis 20 %
Blake's.......dis 20&5 %
Try Squares.—Star Tool Co.......dis 33⅓ %
Vises.—K. P. & Co.'s Solid Box, Blacksmith...℘ ℔ 15½c
Parker's Parallel.......dis 5 %
Backus.......dis 25 %
"Howards," Parallel.......dis 10 %
Weights.—Window Weights.......℘ ℔ 2½c
Wrenches.—Coe's Genuine Wrenches.......dis 40 %
Wringers.—
Novelty and Universal } Tub No. 2 } less than 5 doz..℘ doz $72 00
5 doz..℘ doz 69 00
10 doz..℘ doz 67 00
Moritor, Double Cogs.......per doz 66·00
Novelty Bench, No. 4, } less than 5 doz..℘ doz 108 00
5 doz..℘ doz 104 00
10 doz..℘ doz 101 00
Zinc.—Sheet.......℘ ℔ 10½c

Boston Metal Market.

(*Corrected by Fuller, Dana & Fitz.*)

Tin Plates.—	℘ box	I. C. Coke.......	@ $12 00
I. C. Charcoal..	@ $13 50	" Terne....11 50 @	13 00
Pig Tin.—	℘ ℔	Straits, gold.......	32c
Banca, gold.......	37c	English ".......	32c
Copper.—	℘ ℔	Braziers.......	40c
Sheathing.......	38c	Ingot.......	28c
" Yellow	c	Old.......	26c
Bolt.......	40c		
Lead.—	℘ ℔	Sheet and Pipe.......	9·45c
Spanish Pig, gold	6½c	Old.......	6½c
Spelter.	℘ ℔	American, gold.......	7c
Silesian, gold.......	8c		

Zinc.—Sheet.......℘ ℔ 10½c
Iron.—Sheet Iron, Russia, gold.......℘ ℔ 18c
Sheet Iron, English.......“ 7c
" " American.......“ 7½c
" " Galvanized.......“ 11c @ 18c
Swedes Bar Iron, Flat, gold.......℘ ton, $145 00 @ $155 00
" Shoe Shapes, gold....... 155 00 @
Norway Bar Iron, Flats, gold....... 145 00 @ 152 00
" Shapes, gold....... 155 00 @
" Round, 2 in. to ⅜ in., gold....... 147 50 @ 152 50
" " 11-16 to ⅜ in. "....... 162 50 @
" " 5-16 to ¼ in. "....... 165 00 @
" Nail Rods, Rolled "....... 177 50 @
" " U. B. "....... 172 50 @
" " Benzon "....... 167 50 @
" " Vasa "....... 160 00 @
" " N I W "....... 160 00 @
English Refined Bar Iron....... 87 50 @
Scotch Pig Iron....... 43 00 @ 45 00
American "....... 38 00 @ 48 00
Wrought Scrap Iron....... 45 00 @

Steel.—	℘ ℔	German.......	11c
Eng. Tool, gold	16c	Spring.......	9c
" Mach. "	10c	Tire.......	8c
American Tool	16c	Sleigh Shoe.......	6½c
" Mach	11c	Toe Calk.......	8½c
Bessemer......8½c @ 9½c			

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Anvils.—Armitage.......℘ ℔, gold, 18c
Peter Wright's.......“ 14½c
Wilkinson's.......“ 12½c
Apple Parers.—Conqueror.......℘ doz, $9 00
Lightning.......“ 9 00
Turn Table.......“ 9 00
Augers and Bits.—Cook's.......dis 25 %
Ives'.......dis 20 %
Jennings'.......dis 5 %
Snell's.......dis 12½ %
Axes.—Hunt's.......℘ doz $14 50 @ 15 50
Lippincott's.......“ 14 00 @ 15 00
Lippincott's Pioneer.......“ 14 50 @ 15 50
Simmons'.......“ 13 50 @ 14 50
Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles.......dis 10 %
Swelled Taper Axles.......dis 10 %
Concord Axles.......dis 10 %
Red Jacket Axles.......dis 10 %
Common Axles, 1½ inch and upward.......℘ ℔, 8½c
" " less than 1½ inch.......“ 9½c
Bells.—Troy, Church.......℘ ℔, 50c
Light Brass, Hand.......dis 50 %
Moore's, Cow.......dis 10 %
Bolts.—Arms, Bell & Co.'s Machine.......dis 10 %
Arms, Bell & Co.'s Carriage and Tire..new list dis 70 %
Norway Iron Carriage and Tire.......dis 40 %
Cast Iron Barrel, Shutter, &c.......dis 25 %
Cast Butt Hinges.—Narrow Fast Joint.......dis 25 %
Broad Fast Joint.......dis 40 %
" Loose ".......dis 50 %
Reversible.......dis 45 %
" Japanned and Silver Tipped.......dis 40 %
Loose Joint "Acorn" " ".......dis 40 %
Excelsior Reversible Blind.......dis 30&10 %
Lull & Porter's Blind.......dis 35 %
Wrought Butts.—Narrow.......dis 20 %
Reversible.......dis 25 %
Broad.......dis 25 %
Table Hinges.......net list
Back Flaps.......net list
Inside Blind Hinges.......net list
Casters.—Porcel'n Wheel Bed or Plate..rev. list dis 15 %
Iron or Brass Wheel Bed or Plate.......
Chain.—Eng. Coil..3-16 ¼ 5-16 ⅜ 7-16 ½ in.
14 11½ 10¾ 10 9½ 9c gold
Trace.......6½-10-2 75c "
7-10-2 80c "
German Coil and Halter.......new list add 25 % "
American Coil—Short Link.
Size, inches....... ⅜ 7-16 ½ 9-16 ⅝
Price cents ℘ ℔....... 12¾ 12½ 10½ 10 9½ net
Size, inches.......11-16 ¾ 13-16 ⅞ 15-16
Price, cents ℘ ℔....... 9½ 8¾ 8⅝ 8½ 8⅜ net
Size, inches....... 1 1 1-16 1⅛ 1 3-16 1¼
Price, cents, ℘ ℔....... 8½ 8½ 8 7⅞ 7⅞ net
All larger sizes same price as 1¼ in. Std chain 1c less than same size close link.
Chisels.—Socket, Firmer or Framing.......dis 55 %
Clothes Wringers.—Colby's.......℘ doz $66 00
Novelty.......“ 72 00
Universal.......“ 72 00
Monitor.......“ 72 00
Coffee Mills.—Parker's.......net list
P. S. W. & Co.'s.......net
Corn Knives.—Dunn E'ge T'ol Co.'s Clip..℘ doz $5 75
Disston's.......“ 6 00
Crow Bars.—Steel Pointed.......℘ ℔ 8 @ 10c
Solid Cast Steel.......“ 20c
Cutlery.—J. Russell & Co.'s.......
Lamson, Goodnow & Co.'s....... } new list, dis 15 %
Landers, Frary & Clark's.......
Files and Rasps.—
Nicholson's Mill Files.......$5 50 to the £, currency
Nicholson's Other Files....... 5 00 to the £, currency
Butcher's Files....... 7 00 to the £, currency
Heller's & Bros. Horse Rasps... 5 25 to the £, currency
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.......dis 25 %
" " Handled Hoes.......dis 20 %
" " Planter Eye Hoes.......add 20 %
Winsted's Planter Eye Hoes.......add 20 %
Hammers.—Yerkes & Plumb.......new list net
Masons' Hammers.......℘ ℔ 20c
Smith Hand Hammers.......“ 22c
Handles.—Axe.....Extra. No. 1. No. 2. No. 3.
$2·75 $2·25 $1·75 $1·00
Pick.......Extra. No. 1. No. 1½. No. 2.
$2·50 $2·00 $1·75 $1·25
Smith & Montross Fork, Hoe and Rake.......dis 10 %
" " Broom and Mop.......$12 @ $18 ℘ M.
Harrow Teeth.—1 inch iron.......℘ ℔ 5½c
⅞ and ¾ inch iron.......“ 5⅝c
⅝ inch iron.......“ 5¾c
Barbed or Headed.......½c extra
Hatchets.—Hunt's.......net list
Simmons'.......dis 5 %
Hay Knives.—Lightning.......℘ doz $22 00
Dunn Edge Tool Co.'s.......℘ doz $14 50—dis 15 %
Fisher's.......“ 16 50—dis 10 %
Hinges.—Strap and T—St. Louis make.......dis 25 %
Horse Nails.—Eureka.......23c rates
Ausable.......22c "
Northwestern.......22c "
Eagle.......19c "
National Patent Pointed.......21c "
" " Extra Finished.......22c "
Horse Shoes.—R. I. (Perkin's pat.).......℘ keg $7 00
Burden's.......“ 7 00
Mule Shoes.......$1 00 extra
Rhode Island Trotting Shoes.......2 50 "
Locks and Latches.—
Jones & Nimick's.......revised list dis 40 %
Moorhead, Adams & Co.......dis 40 %
Norwalk Lock Co.'s revised list.......dis 35 %
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....℘ doz. $15 00 @ 16 00
" Grub Hoes, Oval Eye....℘ doz. 12 00 @ 13 00
Nails.—Wheeling.......$4 75 rates.
Orders for 100 kegs 10c ℘ keg less.
Picks.—Klein, Logan & Co.'s R. R. and Clay ℘ doz. $12 00
Klein, Logan & Co.'s Coal.......“ 9 75
" " Poll.......“ 12 00
" " Stone.......“ 16 50
" " Tamping.......“ 19 00
Planes.—Ohio Tool Co.'s.......dis 10 %
Eastern.......dis 20 %
Post Hole Augers.—Clark's Patent—
No. 1, ℘ doz. $27; No. 2, $30; No. 3, $32.......dis 20 %
Barton's Patent.......℘ doz $25—dis 20 %
Vaughn's ".......“ 25—dis 10 %
Sad Irons.—Monitor Brand, Silver Polished....℘ ℔ 6c
Sash Weights.—Standard Solid Eyes.......℘ ℔ 3½c
Saws.—Disston's.......dis 10 %
Spear & Jackson's.......$5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s.......dis 10 %
Branch, Crooks & Co.'s.......dis 10 %
Livingston's Patent Buck.......net list
Screws.—American Screw Co.'s revised list....dis 45 %
$2000 worth in 6 months.......2½ % extra
Scythes.—Blood's C. S. & G. S.......net list
Dunn Edge Tool Co.'s, Factory List.......dis 15 %
Paris Furnace Co.'s.......dis 25 %
Waldron's English.......$10 00 to £
Scythe Stones.—No. 1 Ind'n Pond ℘ gr's, $7 00 }
Extra Indian Pond.......“ 7 50 }
Premium.......“ 9 50 } dis 25 %
Diamond Grit.......“ 13 50 }
Shovels, Spades and Scoops.—Ames'....50c off list
Lippincott's.......new list net
Rowland's, Maxwell.......revised list net
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.......℘ ℔, 17c
Solid Cast Steel.......“ 35c
Striking Sledges.......℘ ℔ extra, 1c
Snaths and Cradles........dis 20 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.......dis 5 %
Blue Seat Springs.......new list dis 10 %
Tacks.—Norway Tack Co.'s ½ weight.......dis 67½ %
Brads.......dis 50 %
Traps.—Newhouse Patent.......dis 15 %
Reichard's Animal, Wood Bottom.......℘ doz $10 00
" " Metal Bottom.......“ 12 00
Vises.—Solid Box.......℘ ℔ 18c
Wilson Mfg. Co.'s.......dis 15 %
Wrenches.—Coes' Genuine.......dis 30 %
Coes' Pattern.......dis 40 %
Taft's.......dis 50 %

St. Louis Metal Market.

(*Corrected Weekly by Messrs. R. Sellew & Co.*)

Tin Plate.

IC, 10x14, Charcoal...	$13 00	IX, 20x28, Terne.......	$31 00
IX, 10x14, " ...	16 00	IC, continuous,	
IC, 12x12, " ...	13 50	20 in. x 200 ft.......	
IX, 12x12, " ...	16 50	IX, continuous,	
IC, 14x20, " ...	14 00	20 in. x 200 ft.......	
IX, 14x20, " ...	17 00	IC, 10x14, best Coke..	12 00
IC, 14x20, Terne.......	12 50	IC, 10x14, good " ..	11 50
IX, 14x20, "	14 50	IC, 10x20.......	19 50
IC, 20x28, "	26 00	IC, 14x20.......	

Block Tin.

Large Pigs.......40c | Bars.......42c
Small ".......41c

Sheet Zinc.

Casks.......℘ ℔ 11c | Sheet.......℘ ℔ 11½c

Solder.

No. 1, Refined, in bars or plate.......23c
No. 2, " " ".......21c
Pig Lead.......8c
Sheet Copper.—18 to 100 lbs. Sheets 30x60.......40c
14 to 16 lbs., Sheets 30x60.......40c
10 to 12 lbs., " and 20x72.......43c
6 to 9 lbs., ".......46c
Tinned, 14 and 16 oz. 14x48.......38c
Planished, 14 and 16 oz. 14x48.......46c
" No. 7, 8 and 9.......48c
Copper Bottoms.......40c

Sheet Iron.—	Com'n.	Sm'th.	Char'l.	Jun.
No. 16 to 20.......	6½c	7½c	8½c	
No. 22 to 24.......	6½c	7½c	8½c	
No. 26.......	6½c	7½c	9c	11¼c
No. 27.......	6⅞c	7⅞c	9¼c	11½c

Galvanized Iron.......dis 25 %
Iron Rivets.......dis 15 @ 20 %
Iron Wire.......dis 25 %
Coppered Pail Bail Wire.......dis 10 %
Copper Rivets and Burs.......dis 10 %
Russia Iron.—Nos. 9, 10, 11 and 12, ℘ ℔.......23c
No. 1, stained, ℘ ℔.......22c
Imitation Russia, ℘ ℔.......15c

CHICAGO.

(*Reported by Cragin Bros. & Co., 141, 143, and 145 Lake St.*)

Tin Plate.—		IXX, 14x20, Charcoal..	20 00
IC, 20x14, Coke.....	$12 00	IXXX, 14x20, " ...	23 00
IC, 10x14, Charcoal.	13 00	IXXXX, 14x20, " ...	26 00
IX, 10x14, " .	16 00	IX, 14x14, " ...	27 50
IC, 12x12, " .	13 50	DC, 100 Plate, " ...	13 00
IX, 12x12, " .	16 50	DX, " ...	15 00
IC, 14x20, " .	14 00	DXX, " ...	19 00
IX, 14x20, " .	17 00	DXXX, " ...	22 00

IC, 14x20, Coke Roofing.......
IC, 10x20 Coke, for Gutters....... 20 00
IC, 14x20, Charcoal Roofing....... 12 50
IX, 14x20 "....... 15 00
IC, 20x28,....... 26 00
IX, 20x28,....... 32 00

Pig Tin.—		Small, 30 ℔.......	41c
Large, 60 ℔.......	40c	Bar Tin.......	42c
Zinc.—			
In casks 1000 ℔s.......	11 c	In sheets.......	11½c
" 500 "	11½c	Slab.......	9c

Copper.—Copper Bottoms.......40c
Sheathing Copper.......38c
Planished Copper, 14x48.......46c
Size, 14x52, 14x56, 14x60 } Planished Copper.......48c
Nos. 7 8 9 }

Braziers' Sheets, 30x 60.—6 to 8 lbs.......	46c	15 to 100 lbs.......	40c
10 and 12 lbs.......	43c	Ingot Copper.......	
		Bolt ".......	45c
Solder.—Extra Fine, C.		Ordinary, No.	21c
B. & Co.'s Brand.......	25c	Plumbers' Solder.......	23c
Fine, No. 1.......	23c	Braz'rs' or Spelt'r Solder	35c

Antimony.......20c
Babbit Metal.......15c @ 25c.
Galvanized Iron Conductor Pipe.......℘ ℔ 10c

Sheet Iron.—	Common.	Smooth.	Charcoal.
No. 14 to 24.......	6 c	7½c	8½c
25 & 26.......	6½c	7½c	9 c
27.......	6½c	7⅞c	9½c

Add ½c ℘ ℔ for 30 in. wide.

Galvanized Iron.......dis 25 %

No. 16 to 20.......	15c	No. 27.......	18c
21 to 24.......	16c	28.......	20c
25 & 26.......	17c		
Russia Iron.—		No. 13.......	c
Perfect, 8, 9 and 10....	23c	In Sheets, 1c. higher.	
" 11 and 12......	22c		
American Russia.—		B.......	13c
A.......	15c	In sheets, 1c higher.	
Lead.—		Lead Pipe, in full coils	10½c
Pig.......	8½c	Lead Pipe, when cut,	
Bar.......	10c	Sheet Lead.......	10½c

DETROIT.

(*Reported by Messrs. Jewett & Root.*)

Tin Plate.—Best Charcoal		**Copper.**—	
IC, 10x14.......	$12 00	Sheathing.......	37½c
IX, 10x14.......	14 75	Copper Bottoms.......	39½c
XX, 10x14.......	17 50	**Planished Copper.**—	
IC, 12x12.......	12 50	Sheathing, 14x48.......	46c
IX, 12x12.......	15 25	Boiler Size, No. 7.......	48c
IC, 14x20.......	13 00	" " No. 8.......	48c
IX, 14x20.......	15 75	" " No. 9.......	48c
XX, 14x20.......	18 50	**Pig Tin.**—	
XXX, 14x20.......	21 25	Large Pigs.......	38c
XXXX, 14x20.......	24 00	Small Pigs.......	39c
DC, 100 Plate.......	11 50	Bars.......	40c
DX, ".......	14 25	**Solder.**—No. 1.......	21c
DXX, ".......	17 00	No. 2.......	19c
DXXX ".......	19 75	**Bright Wire**...dis 27½ %	
DXXXX 100 Plate..	22 50	**Sheet Iron.**—	
IX, 14x14.......	25 25	No. 18 Am. Com.......	5·8c
IC, 10x14 W.......	11 50	No. 24 Am. Com.......	6·0c
IX, 10x14 W.......	14 25	Pat. Am. Russia "A,"	
Roofing Tin.—Best Char.		Nos. 24, 25 & 26.......	14c
IC, Terne, 14x20......	$11 25	Russia No. 9, 10, 11&12.	21½c
IX, " 14x20......	14 00	W. D. WOOD'S & CO.'S SHEET IRON.—	
IC, Terne, 20x28......	24 50	Nos. 15 to 20 Smooth	$7 05
IX, " 20x28......	29 00	" 21 to 24.......	7 25
Coke Tin.—		" 25 & 26.......	7 45
IC, 10x14 Coke......	$10 00	" 21 to 24 Char'l..	8 75
IX, 10x14, Coke	12 75	" 25 & 26 " ..	8 95
IC, 14x20, "	11 00		

Sheet Zinc.—Any width.......10½c

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.......$13·50 @ $14·50
I. C. 10x14 best Coke....... 12·00 @ 13·50
I. C. Terne, 14-20....... 12·00 @ 13·00
I. C. " 20-28....... 26·00 @ 27·50
I. C. Continuous....... 28·00

Pig Tin.—		Straits.......	℔ ℘ 41c
Banca.......℘ ℔	47c	English.......	41c
Solder.—		A 1.......℘ ℔	24c
S. & Co.......℘ ℔	28c	Roofing....... "	22c
Lead.—Pig..℘ ℔ 7½c @ 8c.		Bar.......℘ ℔	8c @ 9c
Copper.—			
Ingot.......℘ ℔	30c @ 31c	Brazier, 6 to 9 lb...℘ ℔	46c
Planished... "	51c @ 53c	" 10 to 14 lb... "	42c
Sheathing.. "	44c @ 46c	" 14 to 100 lb.. "	40c
Bolt....... "	40c	Copper Bottoms... "	40c

Zinc.—Cask, 500 to 1000 lbs.......℘ ℔ 11 c
Case, 100 lbs.......“ 11½c
Slab.......“ 8½c @ 9c

Brass.—		Roll, No. 38 to 40...℘ ℔	50c
Roll, No. 6 to 30. ℘ ℔	45c	Wire, No. 0 to 20...℘ ℔	50c
" 30 to 38. "	65c	" 20 to 25... "	60c
Babbit Metal.—		Black Lead.......℘ ℔	25c
Sellew & Co.......℘ ℔	35c	Market....... "	15c

Antimony.......℘ ℔ 20c
Bismuth.......℘ ℔ $6 00
Nickel.......℘ ℔ $3 50

Sheet Iron.—		Am Russia A..℘ ℔	14 @ 15c
Russia......℘ ℔ 20c @ 22c		" " B.. "	13 @ 14c

	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'fd.
15 to 20.......	6·0c	7·5c	9·0c
22 to 24.......	6·2c	7·8c	9·2c
26.......	6·4c	8·0c	9·4c
27.......	6·6c	8·2c	9·6c

Galvanized Iron.—Full bundles.......dis 25 %

Nos. 18 to 20.......	15c	No. 27.......	18c
22 to 24.......	16c	28.......	20c
25 to 26.......	17c		

Bar Steel.—Silver, ℘ ℔ 21c; Crescent, 17½c.
Iron Wire.......dis 25 %
Enameled Ware.......dis 33⅓ %
One Piece Corrugated Elbows.......dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch.......℘ doz	$3·75	4½ inch.......℘ doz	$8·00
5 " .... "	4·25	5 " .... "	10·00
5½ " .... "	5·25	5½ " .... "	13·00
6 " .... "	5·25	6 " .... "	13·00
7 " .... "	6·50	7 " .... "	14·00

Leader Elbows—Flat Crimp Retinned.—

℘ doz.		℘ doz	
2-inch.......	$2 00	2½-inch.......	$2 25
3-inch.......	2 50	3½-inch.......	3 00
4-inch.......	3 50	4½-inch.......	4 00

Sheet Iron Bread Pans.......℘ ℔ 12c
American Broilers.......℘ doz, $13·50
Tinmen's Machines.......net list
Sad Irons.......℘ ℔, 5½c
Brass Kettles.—Ansonia.......48c

London Metal Market.

(*From The Mining Journal.*)

	£.	s.	d.	£.	s.	d.
Copper—℘ ton.						
Best Selected.......	92	0	0	95	0	0
Tough Cake & Tile.......	90	0	0	92	0	0
Sheathing and Sheets.......	98	0	0	100	0	0
Bolts.......	100	0	0	—		
Bottoms.......	103	0	0	—		
Old (Exchange).......	85	0	0	—		
Burra Burra.......	92	0	0	—		
Wire.......℘ ℔.	0	1	0½	—		
Tubes....... "	0	1	0½	0	1	1
Brass—℘ ℔.						
Sheets.......	0	0	10	0	0	11
Wire.......	0	0	10½	—		
Tubes.......	0	0	11½	0	0	11½
Yellow Metal Sheathing.......	0	0	8½	0	0	9
Sheets.......	0	0	8½	—		
Tin—℘ ton.						
English Blocks.......	126	0	0	—		
Ditto Bars.......	127	0	0	—		
Ditto Refined.......	128	0	0	—		
Banca.......	122	0	0	124	0	0
Straits.......	121	0	0	122	0	0
*Tin Plates—† ℘ box.						
IC Charcoal.......1 qual.	1	16	0	1	18	0
IX " ....1 qual.	2	2	0	2	4	0
IC " ....2 qual.	1	14	0	1	16	0
IX " ....2 qual.	2	0	0	2	2	0
IC Coke.......	1	10	0	1	12	0
IX ".......	1	16	0	1	18	0
Canada Plates.......℘ ton.	22	0	0	23	0	0
" at works.......	21	10	0	22	0	0
Spelter—℘ ton.						
Foreign.......	26	10	0	27	10	0
To arrive.......	—			—		
Zinc—℘ ton.						
In Sheets.......	32	10	0	33	0	0
Iron—℘ ton.						
Bars Welsh, in London.......	12	10	0	—		
" to arrive.......	12	5	0	—		
Nail Rods.......	12	15	0	—		
Nail Rods, Staff'd in L'ndon	13	5	0	—		
Bars.......	13	15	0	14	0	0
Hoops.......	14	15	0	16	0	0
Bars at Works.......	13	0	0	15	0	0
Hoops ditto.......	14	0	0	16	0	0
Sheets, single.......	15	10	0	16	0	0
Pig, No. 1, in Wales.......	5	0	0	6	10	0
Refined metal ditto.......	7	0	0	8	0	0
Bars, common ditto.......	11	10	0	11	15	0
Do, merchant, Tyne or Tees	11	10	0	11	15	0
Ditto, Railway, in Wales.......	11	0	0	11	10	0
Ditto, Swedish, in London.......	19	15	0	—		
To arrive.......	20	10		21	10	0
Pig, No. 1, in Clyde.......	5	5	0	7	0	0
Ditto, f.o.b., Tyne or Tees..	4	10	0	5	10	0
Ditto, Nos. 3, 4, f.o.b.......	—			—		
Railway Chairs.......	5	5	0	6	0	0
" Spikes.......	12	10	0	14	0	0
Indian Ch'coal Pigs in L'don	10	0	0	12	0	0
Steel—℘ ton.						
Swedish, in kegs (rolled).......	—			—		
Ditto (hammered).......	21	0	0	21	10	0
Ditto, in faggots.......	—			—		
English, spring.......	25	0	0	—		
Quicksilver—℘ bottle.	16	0	0	nom.		
Lead—℘ ton.						
English Pig, common.......	23	15	0	—		
Ditto, LB.......	24	0	0	—		
Ditto, WB.......	25	0	0	—		
Ditto, Sheet.......	24	10	0	—		
Ditto, Red Lead.......	24	15	0	25	0	0
Ditto, White.......	30	0	0	33	0	0
Ditto, Patent Shot.......	26	10	0	27	0	0
Spanish.......	23	5	0	23	10	0

* At the works, 1s. to 1s. 6d. per box less. Terne Plates 2s. per box below Tin Plates of similar brands. Add 6s. for each X.

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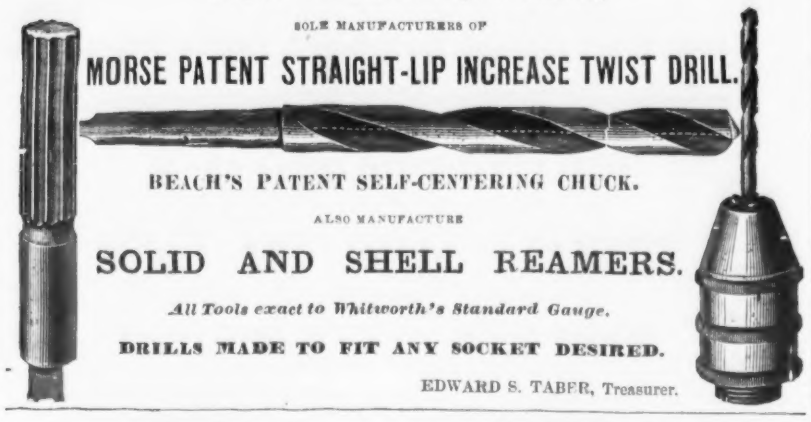

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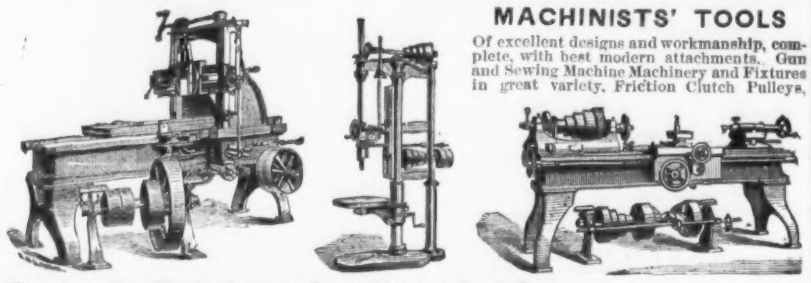

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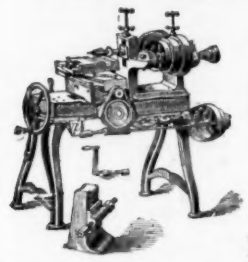

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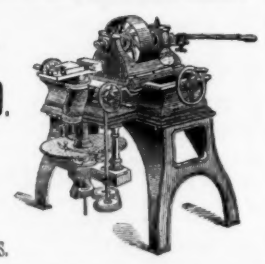

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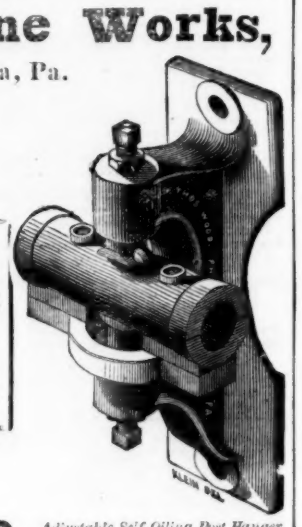

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☞ It has no Back Draught.

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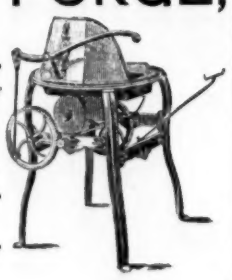

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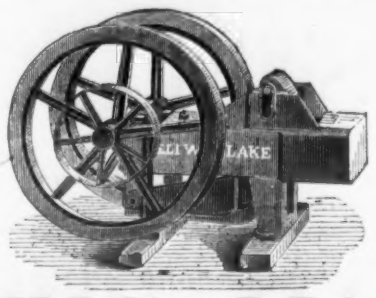

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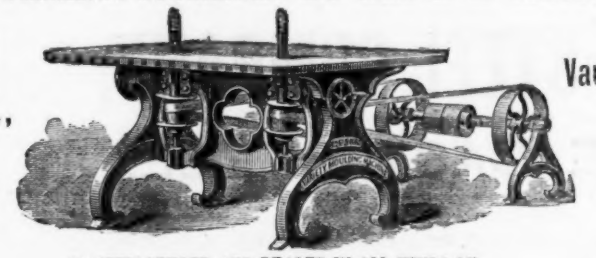

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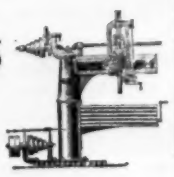

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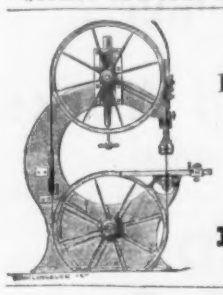

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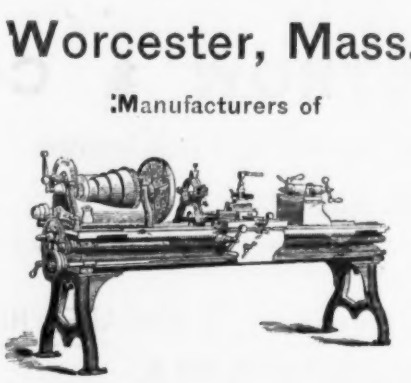

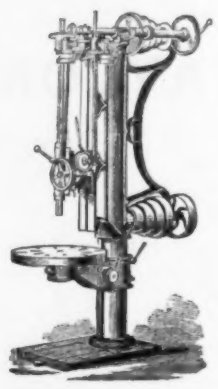

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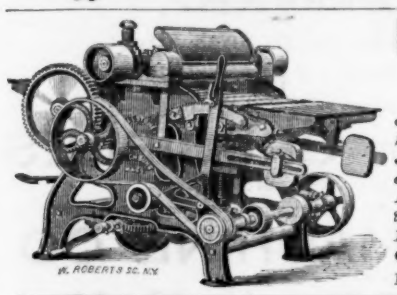

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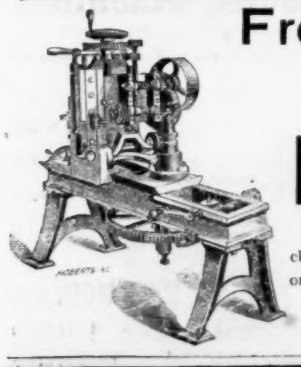

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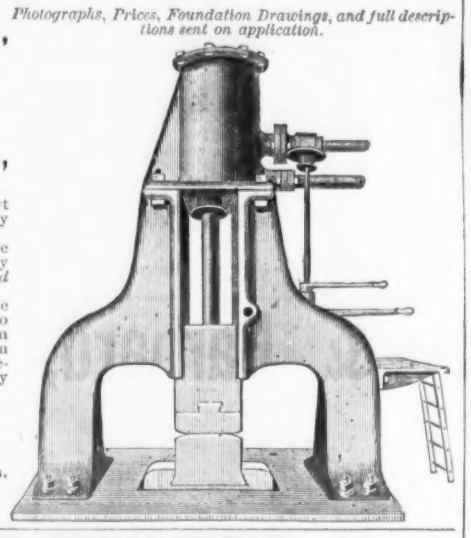

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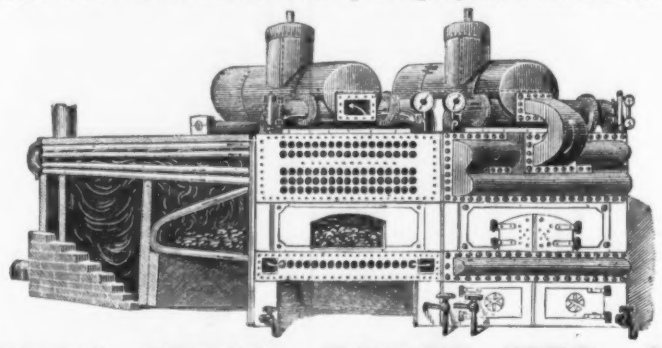

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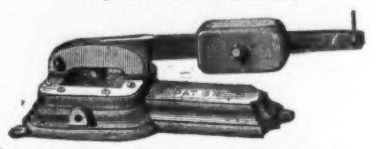

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Agents Wanted. Send for Circulars.

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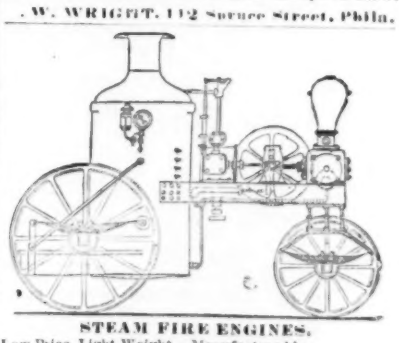

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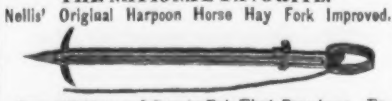

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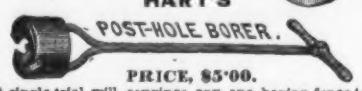

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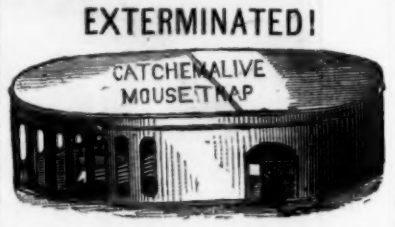

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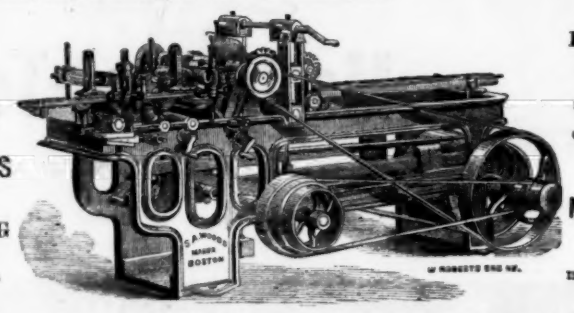

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